

...Journal...
of the
West Australian
Natural History Society

with which is incorporated
The Mueller Botanic Society.

No. VI.—February, 1909.

Perth:
V. K. Jones & Co., Printers, Queen's Place, William Street.

JOURNAL
of the
West Australian
Natural History Society
with which is incorporated
The Mueller Botanic Society.



No. VI.—February, 1909.



Perth :
V. K. Jones & Co. Print, Queen's Place.



West Australian Natural History Society.

(With which is incorporated the Mueller Botanic Society.)

No. 6.—FEBRUARY, 1909.

OFFICERS 1908-9.

Patrons:

HIS EXCELLENCY THE GOVERNOR AND LADY BEDFORD.

President:

J. B. CLELAND, M.D.

Vice-Presidents:

THE RIGHT REV. DR. RILEY, BISHOP OF PERTH.

BERNARD H. WOODWARD, C.M.Z.S., F.G.S.

A. GIBB MAITLAND, F.G.S.

Council:

CECIL R. P. ANDREWS, M.A. C. P. CONIGRAVE.

ALEX. MORRISON, M.D. E. S. SIMPSON, B.E., F.C.S.

H. M. GILES, F.E.S. FRANK TRATMAN, M.D.

T. N. LEE, M.A.

Treasurer:

CECIL ANDREWS, M.A.

Editors of Journal.

CECIL ANDREWS, M. A. J. B. CLELAND, M.D.

Auditors:

J. W. LANGSFORD.

H. R. COOMBS.

Secretary.

LUDWIG GLAUERT, F.G.S., The Museum, Perth.

Table of Contents.

	PAGE.
Records of West Australian Botanists.	
By J. H. MAIDEN, F.L.S.	
Part I.—Western Australian Botanists	5
Part II.—Australian Botanists who have dealt with the Flora of W.A.	28
An Objection to the Direct Continuity of the Germ-plasm, with a suggestion as to the Part possibly Played by Hor- mones in Heredity	34
By J. BURTON CLELAND, M.D.	
Biological Notes on <i>Acacia Celastrifolia</i>	38
By OSWALD H. SARGENT.	
A Scientific Trip to the North Coast of Western Australia ...	45
By J. BURTON CLELAND, M.D., and H. M. GILES, F.E.S.	
Systematic Notes on Orchidaceæ	64
By OSWALD H. SARGENT.	

RECORDS OF Western Australian Botanists

BY

J. H. MAIDEN,

Government Botanist and Director of the Botanic Gardens,
Sydney.

I have used the term "botanist" in a somewhat wide sense, having included collectors of note whether they described their finds or not, notable horticulturists, and, in my general list (5) botanists who have described Australian plants whether they visited this land or not. I have included no living man, so far as I am aware.

Some notes on South Australian botanists will be found in (4), of New South Wales ones in (5), and I am taking steps to publish my notes on the botanists of other Australian States in their respective States.

It will be seen how imperfect is the record of some who have worked amongst us and who have not been removed by the hand of death very long.

Records of departed botanists form a branch of Australian history of practical value to working botanists. They afford a guide to their published works and indicate where their observations were made.

The lists of species named after the various botanists and collectors are valuable (so I have often found) for tracing particulars of botanical journeys, biographical notes and other useful information.

BAILEY, F. M. "A concise history of Australian botany." *Proc. Roy. Soc. Queensland*, VIII. Quoted as (1).

HOOKE, J. D. "Introductory Essay to the Flora of Tasmania," CXII-CXXVIII ("Outlines of the progress of Botanical Discovery in Australia"). Quoted as (2).

MAIDEN, J. H. Address of the President, Section D., Biology Australasian Association for the Advancement of Science, Adelaide Meeting, 1907. Contains biographical notices of South Australian and some other botanists. Quoted as (4).

MAIDEN, J. H. "Records of Australian Botanists, (a) General, (b) New South Wales" (*Proc. Roy. Soc. N.S.W.*, XLII, 1908). Quoted as (5).

BRITTEN & BOULGER. Select Bibliography, "British and Irish Botanists." Quoted as (6).

MENNELL, PHILIP. "The dictionary of Australian biography from the inauguration of responsible government down to the present time (1855-1892)." London, 1892. Quoted as (7).

Backhouse, James (1794-1869). A Quaker philanthropist who visited the Australian Colonies in 1838-41. He was an excellent botanist and made valuable observations. See (5).

Baxter, William (). Britten and Boulger (6) state that he died before 1836.

"In 1823-5 and 1829 the vicinity of King George's Sound, Wilson's Promontory, Cape Arid, and Lucky Bay were explored botanically by Mr. Baxter, a gardener sent out by private enterprise, to collect seeds and roots of Australian plants. Many of his specimens are in Sir W. Hooker's collection, and others in Mr. Brown's, the Proteaceæ of which are included in the supplement to the "Prodomus Florae Novae-Hollandiæ" (2).

We know very little of his 1823-5 trip.

The first reference to Baxter appears to be in Sweet's "Flora Australasica." Plate 1, *Correa pulchella*, is from a plant raised from seed collected by William Baxter on Kangaroo Island and grown in the nursery of Mr. J. Mackay, of Clapton, in 1824.

Mr. Thomas Gill informs me that he believes the only South Australian locality visited by Baxter was Kangaroo Island.

Of his 1828-9 trip, entered into by arrangement with the Sydney Botanic Garden, we know much more, and the following correspondence is published for the first time:—

Botanic Garden,
Sydney,
15th Nov., 1828.

I beg leave to state for the information of His Excellency the Governor that Mr. Baxter, the Botanist, waited upon me this morning to offer his services to the Government as a Collector of Plants and Seeds at King George's Sound and the adjacent country, on the following terms, viz. :—

He offers to make a general collection of seeds and plants and transmit the same to the Government, the Colonial Government retaining one half of each, and to allow the remaining half to be transmitted to his constituents in England; the Government furnishing him with a regular ration and the necessary equipments, such as Twine, Paper, Cases, &c., for the preservation of the collection.

I feel confident, sir, that you will see the advantage of such an engagement sufficiently to justify your recommending the same favorably to His Excellency.

(Sgd) C. FRASER,
Colonial Botanist.

To Honble. A. McLeay,
Colonial Secretary, &c.

The letter is endorsed by the Governor, "Approved, R. D."
(Ralph Darling).

Colonial Secretary's Office,
Sydney, 21 Nov., 1828.

I have received and submitted to the Governor your letter of the 15th inst. containing the offer of Mr. Baxter, Botanist.

In reply I am directed to inform you that His Excellency the Governor has been pleased to sanction this agreement, and that a passage has in consequence been provided for Mr. Baxter on board the "Lucy Annie," to sail on Sunday next.

You will communicate this, therefore, and take particular care to make such arrangements as will ensure the whole of Mr. Baxter's collections being sent on the first instance to the Botanic Gardens of which you have charge
(Sd.) ALEX. McLEAY.

To Mr. Fraser.

King George's Sound,
25th March, 1829.

I embrace the opportunity of sending you a few lines by the Madeira Packet who intends after leaving this to proceed straight to Sydney. I intend taking a long journey to the eastward and if I can prevail on the Captain to land me about 300 miles east of this it will save me all the walk there, and as it is likely that the Lucy Ann may call here before I return, I have put up everything ready for her and left with the commandant to be forwarded to you. You will see that I have not been idle since I arrived. I was much surprised to find everything so late here I have got almost everything that ripened this season, but there is still many not yet ripe. Pitchers are only coming in flower now. Banksias and other large seeds are hardly ripe yet. I have sent you a few of some I collected a good distance inland, but not having near enough to eat I am not able to carry but a small quantity of each sort. I never knew what a ration was before but I find it by far too little to take such long journeys and carry such heavy loads as I do. I mean to collect Banksias and other large seeds in large quantities on my return.

Specimens: I have not got any worth sending, this being the worst time in all the year for them, but if we remain here until the spring I will get a rare collection. Plants in boxes: I have not been able to send any, as it is of no use to remove them until we have some rain, as everything here is almost burnt up, but as soon as the rain sets in I mean to plant in boxes all the

plants that I cannot get seeds, of which there is a good many here. Please to let Mr. Welsh (? Walsh) know when there is a ship coming here, as he will have a parcel to send me, and as it will take up too much time to put up my seeds to the different parties I wish to send them to, I think you had better, after dividing them, let him have them, as I will send him word who to send them to, as I should like them to have them while they are good, and perhaps you will have the goodness to assist him in getting them shipped.

(Sd.) WM. BAXTER.

Extract from letter of Lieut. Geo. Sleeman (King George's Sound), dated 25th March, 1829:—

"In compliance with the instructions of His Excellency the Governor conveyed in your letters of the 23rd and 26th of November, I had the best vacant hut on the settlement prepared for Mr. Baxter (Botanist) when he landed, and in order to contribute to his personal comfort as well as to enable him to proceed with more expedition in collecting and preserving the most valuable seeds and plants in this neighbourhood, I gave him the exclusive services of one of the most useful of the Crown prisoners, who attends him on all his botanizing perambulations. He has received a military ration from the period of his arrival, and I have assured him of my desire to render him every assistance he may require. I shall be very careful to ascertain that everything he collects shall in the first instance be sent to the Botanic Garden, Sydney."

On 14th May, 1829, Lieut. Sleeman again wrote:—

"I beg to transmit herewith a list of the seeds collected by Mr. Baxter and forwarded to the Botanic Garden at Sydney by the "Lucy Ann," and in doing so I feel pleasure in stating that his exertions to get a good collection have been unremitting."

Again, on 9th July, 1829, Lieut. Sleeman wrote:—

"Mr. Baxter, Botanist, having expressed a desire to return to Sydney by the "Prince of Denmark" (sealer), the Master of which vessel, being his acquaintance, has offered him a passage for nothing, I have made no objection to his doing so, as he states he has collected most of the seeds and plants that will be of service to him in this neighbourhood. As the vessel will call at several places on the coast on her passage from hence to Sydney, it will afford him an opportunity of which he feels anxious to avail himself of making some valuable additions to his present collection. I feel much satisfaction in stating that during his stay at this settlement his exertions to accomplish the object for which he came here have been unremitting and that his conduct in every respect has deserved my best recommendation. Mr. Forbes (Master of the "Prince of Denmark") has offered to convey the whole of his collection to Sydney free of expense, and as he has assured me that every article shall be taken the greatest care of and as I wish them to be under Mr. Baxter's management I have had them shipped accordingly, and I have the honor to transmit herewith a list of the various articles from Mr. Baxter, together with a receipt for the cases and packages in which they are contained from Captain Forbes."

On November 30th, 1829, Dr. Wilson, in his "Narrative of a Voyage round the World," refers to Baxter's visit to Western Australia and to the prisoner who accompanied him. Another reference to Baxter on page 271 has no date assigned to it.

Botanic Garden, 19th Jan., 1830.

The conduct of Mr. William Baxter, Botanist, with whom I entered into an engagement on account of the Colonial Government in October, 1828, to

proceed to King George's Sound to collect plants and seeds jointly for the Government and his constituents in England, has been so outrageous as to call forth the following statements.

The conditions upon which he went to King George's Sound were as follows :—

The Government were to furnish him with a passage to the Sound, supply him with rations from the King's store, paper, &c., while there, and to render him any reasonable assistance; and when his collection was completed the Government was to find him a free passage back to Port Jackson.

On his arrival his collection was to be fairly divided between the Government and his constituents in England. Those constituents are supposed to be Messrs. Henchman* & Co.

He left King George's Sound in schooner "Prince of Denmark" (not waiting for a Government vessel) and arrived in Port Jackson on the 7th Sept., 1829.

The first collection received from him was in April, 1829. They were divided at his own request, and his share given to a person of the name of Walsh, a gardener in Sydney.

On applying for the collection to be landed at the Garden, he made several evasive excuses, when I found it necessary to apply to the Government for an order from the Collector of Customs to prevent them being landed by him, in Sydney.

On the application being granted, an order was given to an Officer of the Customs (Mr. Oliver) to prevent the landing of them, Baxter having previously given particular orders that two sacks containing cones of *Banksias* should not be delivered to any person but himself. On Mr. Oliver going on board and making his business known, Baxter made use of the most abusive language, threatening to knock Mr. Oliver down, at the same time attempting to throw some of the most valuable tubs of plants overboard, until prevented by Mr. Oliver, Mr. McLean (Mr. Fraser's second in command at the Botanic Garden, J. H. M.) and some of the crew.

Such was the violence of his conduct that Mr. Oliver was obliged to send for two constables. When Mr. Baxter saw them approach he left the vessel.

The collection was then landed at the Garden.

Some days after he called at the Garden, when the seeds and dried specimens were divided.

After the division took place I understand that he boasted of having taken means effectually to destroy the first collection; however, many of them are now growing.

On the whole, his conduct in the division has been unfair, and his own threats strengthen me in my opinion that his intentions were to purloin the most valuable part of the collection, for on embarking on board the vessel in which he took his passage to England he publicly stated that after all our look out he had cheated the Government out of the very things he particularly wanted.

(Signed) C. FRASER,
Colonial Botanist.

To the Honourable the
Colonial Secretary.

*See *Chorizema Henchmanni*, R. Br., in *Bol. Reg.*, t. 986. "Named by Mr. Brown in honour of Francis Henchman, Esq., a very successful importer of New Holland plants, for whom the present subject was collected by Mr. William Baxter, at the same place and time as the *Leschenaultia formosa* formerly figured at folio 916 of this work."

The copies of the letters by Lieut. Sleeman were given to me by Mr. Thomas Gill, I.S.O., of Adelaide, who found them some years ago in the Colonial Secretary's Records, Sydney, with the assistance of Mr. J. G. Cohen, Keeper of the Records.

See also Smith, *Records of the Royal Botanic Gardens, Kew*, p. 10 ; also (6).

He is commemorated by the genus *Baxteria*, R. Br., and by the following species :—*Phebalium Baxteri*, Benth ; *Acacia Baxteri*, Benth ; *Acacia Baxteri*, Meissn*—*Acongesta*, Benth ; *Chorizema Baxteri*, Grah—*Mirbelia Baxteri*, Lindl—*Oxylobium scandens*, Benth ; *Eutaxia Baxteri*, Knowl—? ; *Gompholobium Baxteri*, Benth ; *Eucalyptus Baxteri*, R. Br.—*E. santalifolia*, F. v. M. var. (?) *Baxteri* ; *Helichrysum Baxteri*, A. Cunn ; *Melaleuca Baxteri*, Benth ; *Pentagonaster Baxteri*, Kl.—*Kunzea Baxteri*, Schau ; *Cyathodes Baxteri*, D.C.—*Astroloma divaricatum*, Sond. ; *Leschenaultia Baxteri*, G. Don—*L. formosa*, R. Br. ; *Styphelia Baxteri*, F. v. M.—*Astroloma Baxteri*, D.C. ; *Banksia Baxteri*, Br. ; *Dryandra Baxteri*, Br. ; *Grevillea Baxteri*, Br. ; *Hakea Baxteri*, Br. ; *Hemclidia Baxteri*, Br.—*Dryandra falcata*, R. Br. ; *Isopogon Baxteri*, Br. ; *Prostanthera Baxteri*, Cunn ; *Casuarina Baxteriana*, Miq. ?

In *Proc. Linn. Soc.*, p. 42 (Nov. 18, 1888-June, 1890), there is a portrait of a William Baxter (1787-1871). Engraving by J. Whessell, from a drawing by A. Burt. Elected an Associate, 1817. I wrote to Mr. Daydon Jackson, General Secretary of the Linnean Society, who kindly informs me that he was born at Rugby, 15th January, 1787, and died at Oxford 1st November, 1871. Curator Oxford Botanic Garden, 1813-51

Of the William Baxter who visited Western Australia no portrait can be traced.

Brown, Maitland (-1905). Died at Perth, W.A., in 1905 about June.

He collected botanical specimens in Francis Gregory's Expedition to the North-West (B. Fl.).

He is commemorated by the following species :—*Acacia Maitlandi*, F. v. M.—*A. patens*, F. v. M. ; *Scaevola Maitlandi*, F. v. M.—*S. Cunninghamii*, D.C. ; *Eremophila Maitlandi*, F. v. M. ; *Gomphrena Maitlandi*, F. v. M.

Bynoe, Benjamin (? 1803-1865).

"Capatin King was succeeded by Captain Wickham, who in 1837 commissioned H.M.S. 'Beagle' to explore certain parts of north-western Australia, and the best channels through Bass' and Torres' Straits. Owing to Captain Wickham's illness the command devolved on Captain J. Lort Stokes, who drew up the narrative of the voyage. No botanist accompanied

* —Separating two specific names denotes that they are synonymous.

the expedition, nor is there in the narrative any information of importance on the vegetation of the coasts surveyed; but Mr. Bynoe, the surgeon, made some valuable collections, chiefly on Dupuch Island, the Abrolhos, the Victoria River, Bass' Strait, and in New South Wales, which are preserved in Sir W. Hooker's herbarium. The 'Beagle' returned to England in 1843" (2).

The Secretary of the Admiralty was kind enough to give me the following particulars of Surgeon Bynoe's services:—

Ships.	Rank.	Period of Service.	
		From.	To.
Victory	Assistant (first entry	27 Sept., 1825	29 Oct., 1825.
Beagle	"	30 Oct., 1825	30 Oct., 1830.
"	"	1 July, 1831	17 Nov., 1836.
"	Surgeon	21 Feb., 1837	14 Oct., 1843.
Blundell (Convict ship) ...	"	21 Feb., 1844	1 April, 1845.
Lord Auckland	"	19 Mar., 1846	6 July, 1846.
Crocodile (for special service)	"	31 Mar., 1847	1 Oct., 1847.
Ocean	"	2 Nov., 1847	10 Jan., 1848.
Ganges	"	11 Jan., 1848	29 Feb., 1848.
Wellington	"	1 Mar., 1848	2 Dec., 1850.
Monarch	"	3 Dec., 1850	3 Mar., 1851.
Aboukir (Convict ship) ...	"	24 Nov., 1851	30 Nov., 1852.
Madagascar store-ship—			
Rio Janeiro .	"	24 Sept., 1853	1 Feb., 1859.
Industry	"	2 Feb., 1859	13 May, 1859.

Date of birth not stated, but was given as 53 in 1856. Retired, 23rd January, 1863; died, 13th November, 1865. Assistant, 27th September, 1825, and Surgeon and Staff-Surgeon (new title), 22nd December, 1836. He is commemorated by *Acacia Bynoeana*, Benth.

Clifton, George (). He collected Algae with and for Prof. Harvey during his visit to Western Australia in 1854.

"A species of *Dasya*, which I shall call *Cliftoni* after my kind friend Mr. Clifton, Supt. of Water Police, Fremantle, whose boat I use and who takes much interest in my work" (*Memoirs of Dr. Harvey*, p. 271).

Harvey's "Phycologia Australica" (1858), Vol. I, is dedicated in the following words :—

TO GEORGE CLIFTON, Esq., R.N., of Fremantle, Western Australia, an acute observer and successful collector of Algæ, the first volume of the "Phycologia Australica" is inscribed, in pleasant memory of our boating and dredging excursions, and as a grateful acknowledgment for liberal supplies of well-selected specimens, by his friend and fellow-student, THE AUTHOR.

In the preface to Vol. 5 the following passage occurs :—

"To George Clifton, Esq., R.N., of Fremantle, Western Australia, whose name occurs so frequently throughout the volume and in the synopsis, I am indebted for some thousands of beautifully preserved specimens, including many species collected by no one else. His contributions commenced in 1854, whilst I was resident in Western Australia, and have been regularly continued, at short intervals, up to the present time (Sept., 1863). Three new genera, *Cliftonia*, *Bindera*, and *Encyothalia*, besides many new species, prove the zeal and success with which Mr. Clifton has conducted his researches."

Harvey named the following genus and species after him, and more Australian Algæ are called after Mr. Clifton than any other man :—

Dasya Cliftoni, Harv. ; *Polyphsa Cliftoni*, Harv. ; *Chyloclada Cliftoni*, Harv. ; *Encyothalia Cliftoni*, Harv. ; *Cliftonia* (later altered to *Cliftonaea* ! see Pl. CCLXXIX) *pectinata*, Harv. ; *Halymenia* (?) *Cliftoni*, Harv. ; *Galaxaura Cliftoni*, Harv.

Collie, Alexander (—1835).

"Mr. Collie, one of the naturalists in Captain Beechey's voyage to the west coast of North America, visited South-Western Australia about the year 1832, and made collections in Swan River and Leuwins Land" (2).

"Died King George's Sound, Dec. (Nov., J. H. M.), 1835. Surgeon, R.N., F.L.S., 1825. On board H.M.S. 'Blossom,' 1825-28. Collected in California, with Lay, in 1827; also in Chili and Australia, 1832. Plants in Herb. Kew, Pritzl, 66; 'Botany of Beechey's Voyage'; Botany of *Geol. Surv. California*, ii, 554 (6).

He was in 1831 Government Resident of King George's Sound, and explored the country to the north. In 1829 the first Exploratory Expedition from Perth set out under command of Lieut. W. Preston, accompanied by Dr. Collie (Cockburn Sound to Geographe Bay). In 1832 he explored between Albany and French River. (Malcolm A. C. Fraser's "W.A. Year-Book"). See also G. R. Gray, *Entom. Aust.*, p. 22. The Admiralty have had the kindness to favour me with the following particulars of Dr. Collie's services :—

First entry 26 Feb., 1813; seniority 17 June, 1821; death 8 Nov., 1835.

Ship.	Rank.	Date of Entry	Date of Discharge.	Remarks.
Doris . . .	Asst. Surgeon	26 Feb., 1813	4 Mar., 1816 .	
Half-Pay.	"	5 Mar., 1816 .	16 June, 1821	
Gannet . .	Surgeon	17 June, 1821	16 Sept., 1824	
Half-Pay.	"	17 Sept., 1824	20 Jan., 1825 .	
Blossom .	"	21 Jan., 1825 .	17 Oct., 1828	
Half-Pay.	"	18 Oct., 1828	23 Nov., 1828	
Sulphur .	"	25 Nov., 1828	30 Nov., 1831	Discharged at Swan River on request
Half-Pay.	Col.-Surgeon, Swan River	4 Feb., 1833 .	8 Nov., 1835 .	Dead

Half-Pay due paid Paul & Co., attys., to Jno. Lewis and Jno. S. Roe, exors. Sworn under £450. First entry, 26th Feb., 1813. Seniority, 17th June, 1821. Death, 8th November, 1835.

Dampier, William (1652-1715).

"For the first glimmerings of light upon the vegetation of Australia, we are indebted to the great buccaneer and navigator Dampier, who in 1688 visited Cygnet Bay, on the North-West coast of the continent, and in 1699 he returned to the west and north-west coasts in H.M.S. 'Roebuck' (*King's Voy.*, i, xxi). The herbarium of Dampier is still preserved at Oxford, and (as I am informed by Mr. Baxter, Curator of the Oxford Botanic Gardens) contains forty specimens, eighteen of which are figured in his 'Voyage,' published in 1703" (2).

"Born East Coker, Yeovil, 1652; died London, Mar., 1715. Circumnavigator. Collected in Brazil, Australia, Timor, New Guinea, &c. 'New Voyage round the World' (1697). Plants in Brit. Mus. (Herb. Sloane, 93, 94) and at Oxford. Pritzel, p. 75; Rees, Cyclopaedia; Rays Hist. Plants, iii (Supp.), 225; Lasegue, 360; Life, Edinburgh Cabinet Library, vol. v, 1830; 'Early English Voyagers,' 1836; Biography by W. C. Russell, 1889; *Journ. Bot.*, 18, 73, 348; *Dict. Nat. Biog.*, XIV, 2. Portrait by T. Murray in National Portrait Gallery." (6).

See the following works:—

"Dampier, William. A new voyage round the World. . . Ed. 3. London, 1698, 8vo.—Voyages and Descriptions . . . to which is added a general index to both volumes, ib., 1699, 8vo.—A voyage to New Holland . . . in the year 1699 . . . vol. iii, ib., 1703, 8vo.

Nouveau voyage autour du monde . . . Rouen, 1723. 5 vols., 12mo.

The voyages and Adventures of Capt. W. D., etc. Liverpool, 1769. 3 vols., 8vo."

He is commemorated by the following species:—

Diplolaena Dampieri, Desf; *Clianthus Dampieri*, A. Cunn; *Beaufortia Dampieri*, A. Cunn; *Eurybia Dampieri*, D.C.—*Olearia axillaris*, F. v. M. var. *normalis*; *Myoporum Dampieri*, Cunn—*M. acuminatum*, R. Br. ? var. *angustifolium*; *Westringia Dampieri*, Br.; *Adriana Dampieri*, F. v. M.—?—Also by the genus *Dampiera*, R. Br. (Goodeniaceæ)

Drummond, James (? 1784-1863). Drummond arrived in W.A. with Capt. Stirling, R.N., in the "Parmelia," as "Agricurist," in the year 1829.

"Early in 1839 Mr. James Drummond, a resident in the Swan River, at Hawthornden, near Guildford, commenced preparing for sale in Europe sets of the plants of his district, which include a vast number of novelties, and rival in interest and importance those of any other part of the world. Mr. Drummond's exertions were actively continued for upwards of fifteen years, during which he made extensive journeys as far as King George's Sound, in a south-east direction, and the Moore and Murchison Rivers to the northward. Some accounts of his journeys and discoveries will be found in the 'Botanical Journal,' vols. ii, ii and iv; in the *London Journal of Botany*, vols. i, ii and iii, and in the *Kew Journal of Botany*, vols. i, ii, iv and v" (2).

"Died Perth, West Australia, 27th March, 1863. A.L.S., 1810. Curator, Bot. Gard., Cork, 1809. Discovered *Spiranthes Romanzoffiana* at Cork in 1810. Went to W. Australia, 1829, as Curator of Bot. Gard. Issued six sets of specimens, beginning 1839. Plants at Brit. Mus., Kew, &c. *Gardeners' Chronicle*, 1841, 341; Munster Farmers' Mag., vi and vii (1818-20); Lasegue, 282; Royal Society's Catalogue, ii, 346; *Proc. Linn. Soc.*, 1864, xli; *Dict. Nat. Biog.*, xvi, 33. *Drummondia*, Harv. (dedicated to the two Drummonds, with the termination *ita*—"an I. for James and a T. for Thomas"). (6).

When Capt. Stirling was first Governor of the Swan River Colony in 1828 "a garden was also formed, which was placed under the superintendence of James Drummond, who for a number of years forwarded large collections of seeds to this country, either to order or on speculation; sets of these collections were always obtained for Kew. ("Records of the Royal Botanic Gardens," John Smith, 1880, p. 11).

He was far and away the most successful collector of Western Australian plants of his time, and a large number of plants were dedicated to him. The following list has been compiled with much labour from the "Flora Australiensis." :—

Boronia Drummondii, Planch.—*B. pulchella*, Turcz.; *Comesperma Drummondii*, Steetz.; *Eriostemon Drummondii*, Muell.—*Asterolasia phebalioides*, Benth.; *Frankenia Drummondii*, Benth.; *Hibiscus Drummondii*, Turcz.; *Lasiopetalum Drummondii*, Benth.; *Ochrolasia Drummondii*, Turcz.—*Hibbertia ochrolasia*, Benth.; *Oncosporum Drummondianum*, Putterl.—*Marianthus Drummondii*

anus, Benth. ; *Pelargonium Drummondii*, Turcz. ;—*P. australe*, Willd. ; *Phebalium Drummondii*, Benth. ; *Sollya Drummondii*, Morren—? ; *Thlaspi Drummondii*, Benth. ; *Acacia Drummondii*, Lindl. ; *Daviesia Drummondii*, Meissn. ; *Drosera Drummondii*, Lehm. ; *Drosera Drummondii* Planch.—*D. penicillaris*, Benth. ; *Gastrolobium Drummondii*, Meissn.—? ; *Gompholobium Drummondii*, Meissn.—*G. aristatum*, Benth. var. *muticum* ; *Isotropis Drummondii*, Meissn. *Myriophyllum Drummondii*, Benth. ; *Oxylobium Drummondii*, Meissn.—*O. cuneatum*, Benth. var. *emarginatum* ; *Psoralea Drummondii*, Meissn.—*P. cinerea*, Lindl. ; *Pultenea Drummondii*, Meissn. ; *Sphaerolobium Drummondii*, Turcz.—*S. macranthum*, Meissn. ; *Swainsona Drummondii*, Benth. ; *Templetonia Drummondii*, Benth. ; *Actinopappus Drummondii*, A. Gray—*Rutidosia Pumila*, Benth. ; *Anthocerastes Drummondii*, A. Gray—*Toxanthus perpusillus*, Turcz. ; *Baeckea Drummondii*, Benth. ; *Blennospora Drummondii*, A. Gray—*Calocephalus Drummondii*, Benth. ; *Brachycome Drummondii*, Walp.—*B. ciliaris*, Less. ; *Calythrix Drummondii*, Meissn.—*C. flavescens*, A. Cunn. var. *Drummondii* ; *Cephalopterum Drummondii*, A. Gray ; *Chamaelaucium Drummondii*, Meissn. ; *Chrysocoryne Drummondii*, A. Gray.—*Angianthus tenellus*, Benth. ; *Chionocephalus Drummondii*, A. Gray.—*C. pseudo-evax*, Steetz. ; *Conanthodium Drummondii*, A. Gray.—*Helichrysum argyroglossis*, Benth. ; *Cotula Drummondii*, Benth. ; *Diotosperma Drummondii*, A. Gray.—*Ceratogyne obionoides*, Turcz. ; *Ericomyrtus Drummondii*, Turcz.—*Baeckea pulchella*, D.C. ; *Eucalyptus Drummondii*, Benth. ; *Genetyllis Drummondii*, Turcz.—*Darwinia diosmoides*, Benth. ; *Gunnia Drummondii*, Benth. ; *Melaleuca Drummondii*, Schau.—*M. uncinata*, R. Br. ; *Micromyrtus Drummondii*, Benth. ; *Pteropogon Drummondii*, A. Gray.—*Helipterum pygmaeum*, Benth. var. *occidentale* ; *Scholtzia Drummondii*, Benth. ; *Skirrophorus Drummondii*, Turcz.—*Angianthus Drummondii*, Benth. ; *Verticordia Drummondii*, Schau. ; *Astroloma Drummondii*, Sond. ; *Atherocephala Drummondii*, DC. *Andersonia aristata*, Lindl. ; *Conostephiopsis Drummondii*, Stsche.—*Conostephium planifolium*, F. v. M. ; *Cynoglossum Drummondii*, Benth. ; *Dampiera Drummondii*, De. Vr.—*D. triloba*, Lindl. ; *Dracophyllum Drummondii*, Benth. ; *Glossostigma Drummondii*, Benth. ; *Leschenaultia Drummondii*, De Vr.—*L. biloba*, Lindl. ; *Leucopogon Drummondii*, DC.—*L. australis*, R. Br. ; *Limosella Drummondii*, F. v. M.—? ; *Scævola Drummondii*, DC.—*S. nitida*, R. Br. ; *Stylidium Drummondii*, Grah.—*S. reduplicatum*, R. Br. ; *Styphelia Drummondii*, F. v. M.—*Astroloma Drummondii*, Sond. ; *Veronica Drummondii*, Benth.—*V. distans*, R. Br. ; *Adenanthos Drummondii*, Meiss.—*A. apiculata*, R. Br. (a mistake—fide Diels) ; *Anisacantha Drummondii*, Benth. ; *Atriplex Drummondii*, Moq. ; *Didymotheca Drummondii*, Moq.—*D. thesioides*, Hook. f. ; *Dryandra Drummondii*, Meiss.—*D. calophylla*, R. Br. ; *Eremophila*

Drummondii, F. v. M. ; *Grevillea Drummondii*, Meiss. ; *Hemigenia Drummondii*, Benth. ; *Isopogon Drummondii*, Benth. ; *Lambertia Drummondii*, Gard.—*L. inermis*, R. Br. ; *Persoonia Drummondii*, Lindl.—*P. longifolia*, R. Br. ; *Petrophila Drummondii*, Meiss. ; *Pityrodia Drummondii*, Turcz. ; *Plantago Drummondii*, DCne.—? ; *Ptilotus Drummondii*, F. v. M.—*Trichinium Drummondii*, Moq. ; *Rhagodia Drummondii*, Moq.—? ; *Rumex Drummondii*, Meissn. *R. pulcher*, Linn. ; *Synaphea Drummondii*, Meiss.—*S. dilatata*, R. Br. ; *Beyeria Drummondii*, Meu. Ar. ; *Caladenia Drummondii*, Benth. ; *Calyptrostegia Drummondii*, Turcz.—*Pimelea suaveolens*, Meissn. ; *Casuarina Drummondiana*, Miq. ; *Conostylis Drummondii*, Benth. ; *Diuris Drummondii*, Lindl.—*D. emarginata*, R. Br. ; *Euphorbia Drummondii*, Boiss. ; *Frenela Drummondii*, Parlat. ; *Patersonia Drummondii*, F. v. M. ; *Poranthera Drummondii*, Kl.—*P. microphylla*, Brongn. ; *Prasophyllum Drummondii*, Reich.—? ; *Aphelia Drummondii*, Benth. ; *Arnocrinum Drummondii*, Endl. ; *Brizula Drummondii*, Hieron.—*Aphelia Drummondii*, Benth. ; *Desvauxia Drummondii*, Nees.—*Centrolepis Drummondii*, Hieron. ; *Dichelachne Drummondiana*, Steud.—*Deyeuxia Drummondiana*, Benth. ; *Discopodium Drummondii*, Steud.—? ; *Gymnochæta Drummondii*, Steud.—*Schænus Drummondii*, Benth. ; *Isoetes Drummondii*, A. Br. ; *Isoschænus Drummondii*, Steud.—*Schænus flavus*, Bœckel. ; *Lepidosperma Drummondii*, Benth. ; *Lepyrodia Drummondiana*, Steud. ; *Lycopodium Drummondii*, Spreng.—? ; *Marsilea Drummondii*, A. Br. ; *Pentapogon Drummondii*, Steud.—*Deyeuxia cylindrica*, Benth. ; *Phylloglossum Drummondii*, Kunze ; *Poa Drummondiana*, Nees.—*P. nodosa*, Nees. ; *Polypogon Drummondii*, Steud. *P. tenellus*, R. Br. var. *Drummondii* ; *Porroteranthe Drummondii*, Steud.—? ; *Potamogeton Drummondii*, Benth. ; *Schænus Drummondii*, Benth. ; *Stipa Drummondii*, Steud. ; *Tetrarrhena Drummondiana*, Nees.—*T. lævis*, R. Br. ; *Thysanotus Drummondii*, Baker ; *Urolepis Drummondii*, Steud.—*Diplachne fusca*, Beauv. ; *Wurmbea Drummondii*, Benth. ; *Xanthorrhæa Drummondii*, Harv.—*X. Preissii*, Endl. ; *Xerotes Drummondii*, F. v. M.

Eyre, Edward John (1815-1901). Immortal from his marvellous overland journey around the Great Bight to King George's Sound. See my account of him in (2).

See also "An historical review of the Explorations of Australia," Mueller (*Trans. Phil. Soc. Vict.*, ii, 148). See also (7) *Pluchea Eyrea*, F. v. M. ; *Pimelea Eyrei*, F. v. M. are dedicated to him.

Gilbert, John (-1845). Gilbert was better known as an ornithologist than a botanist. He was assistant to John Gould, author of "The Birds of Australia." Mr. A. J. North gives some account of him under the title "Two early Australian Ornithologists" (*Records Aust. Mus.*, vi, 125, 1906), and gives an

illustration of the tablet raised to Gilbert's memory in St. James' Church, Sydney.

Gilbert was, however, an excellent botanical collector, carrying on this work concurrently with his ornithological duties.

He first arrived in Australia about 1840, returned to England in 1841, and revisited Australia in 1842, spending most of his time in South-Western Australia. In 1844 and 1845 he was with Leichhardt on his First Expedition to Port Essington, when on 28th June, 1845, on the east side of the Gulf of Carpentaria, he was treacherously speared by the blacks.

His botanical collections are in many herbaria, including those of Kew, the British Museum and Vienna.

In his paper, "On *Jansonia*, a new genus of Leguminosae from Western Australia," R. Kippist, in *Trans. Linn. Soc.* (read May 4th, 1847) says he has "recently been engaged in the examination of an interesting collection of plants formed by the late Mr. Gilbert in W.A., and kindly forwarded to me by Mr. Saunders for determination and the selection of a set for the Society's herbarium." (Some of the specimens came from Scott's "River," anno. 1842 ?).

He is commemorated by the following species:—*Clematis Gilbertiana*, Turcz.—*C. aristata*, R. Br. var. *occidentalis*; *Thomasia Gilbertiana*, Turcz.—?; *Xerosollya Gilbertii*, Turcz.—?; *Acacia Gilberti*, Meissn.; *Bossiaea Gilberti*, Turcz.—*B. eriocarpa*, Benth. ? var. *ericalyx*; *Podolepis Gilberti*, Turcz.—*P. Lessoni*, Benth.; *Senecio Gilberti*, Turcz.; *Verticordia Gilberti*, Turcz.—*V. chrysanthea*, Endl.; *Leucopogon Gilberti*, Stscheg.; *Hakea Gilbertii*, Kipp.—*H. sulcata*, R. Br. var. *Gilbertii*; *Chatodisus Gilberti*, Steud.—?; *Prionosepalum Gilberti*, Steud.—*Chatanthus leptocarpoides*, R. Br.

There is another Gilbert of early W.A. history who must not be confused with the botanist. He is Augustus H. Gilbert, with Charles Fraser (of the Sydney Botanic Gardens) in the "Success" at Swan River in 1827. He was Clerk of the "Success" and afterwards arrived in the Colony in the same capacity on the "Sulphur." A copy of his journal has been preserved. Mr. Malcolm A. C. Fraser, in his *West Australian Year-Book* (1902-4), in giving an account of the visit of the "Success" to Perth, has drawn attention to this earlier Gilbert and his journal.

Grey, George (1812-1898).

"Captain (afterwards Sir George) Grey's expeditions on the west coast of Australia were organised in the hope of discovering a large river or inlet which was supposed to exist in that quarter. The party arrived in Hanover Bay (lat. 15° S.) in 1837, whence several inland journeys were made to the south-west, and the Glenelg River discovered. Captain Grey's second expedition was made in whale-boats, which he took with him in a sailing vessel

from Swan River. He first landed on Bernier Island (lat. 25° S.), where he made a depot; thence he crossed the Gascoyne River, and explored the coast for some miles to the northward; and after encountering great difficulties and hardships, he returned to Bernier Island, where he found that the stores had been utterly destroyed by the ocean, which during the stormy interval had swept over the island. This obliged Captain Grey to return to the mainland, which he reached at Gantheaume Bay (lat. $27^{\circ} 50'$ S.). Here the boats were abandoned, and the overland journey to the Swan River commenced, which was reached by a remnant of the party after having suffered incredible hardships from starvation and the natural difficulties of the country. Of course, no collections of plants were brought back, but the Commander's narrative abounds in valuable observations on the vegetation of the countries visited. Amongst many other observations worthy of note, are that of an *Araucaria* occurring on the mountains of the interior, of a Swan River, *Banksia* near Prince Regent's River, of *Xanthorrhæa* attaining the latitude of 28° , and *Zamia* of 29° , in which latitude the common sowthistle appears to have been found abundantly. Many notices of edible plants are scattered through the narrative, including that of a "Wild Oat," with large grains, which Captain Grey states has been cultivated with success as a cereal in the Island of Mauritius" (2). See also "An historical review of the Explorations of Australia," Mueller (*Trans. Phil. Soc. Vict.*, ii, 148).

Many biographical accounts are available of this eminent explorer and statesman, but I wish to emphasize his services to Australian botany, which were considerable. *Swainsona Greyana*, Lindl., commemorates him.

Harvey, William Henry (1811-1866). Professor of Botany Trinity College, Dublin, and an eminent authority on sea-weeds, who visited the Australian Colonies in 1854-5. See (5).

Huegel, Charles von ().

"Baron Charles von Hügel, the celebrated Austrian traveller, visited the Swan River Colony in 1833, and made considerable collections, some of which were published by Bentham, Fenzl, Schott, and Endlicher, in a work edited by the latter, and commenced in 1837, but never completed" (2).

See Huegel, Carl, Freiherr von, *Enumeratio plantarum quas in Novæ Hollandiæ . . . collegit C. de H. Vindobonæ*, 1837. 8vo.

He is commemorated by the following species:—

Candollea Huegelii, Endl.; *Diplopeltis Huegelii*, Endl.; *Hibiscus Huegelii*, Endl.; *Pittosporum Huegelianum*, Putterl.—*P. bicolor*, Hook.; *Pronaya Huegeliana*, Putterl.—*Billardiera variifolia*, DC.; *Stackhousia Huegelii*, Endl.; *Acacia Huegelii*, Benth.; *Drosera Huegelii*, Endl.; *Gastrolobium Huegelii*, Henfr.—*Pultenæa ternata*, F. v. M.; *Gompholobium Huegelii*, Benth.; *Hardenbergia Huegelii*, Benth.—*H. Comptoniana*, Benth.; *Spadostyles Huegelii*, Endl.—*Pultenæa humilis*, Benth.; *Aster Huegelii*, F. v. M.—*Olearia ciliata*, F. v. M.; *Calothamnus Huegelii*, Schau.—*C. lateralis*, Lindl. var. *rigidus*; *Chrysocoryne Huegelii*, A. Gray.—*Angianthus pusillus*, Benth.; *Lagenophora Huegelii*, Benth.; *Leucolæna Huegelii*, Benth.—*Xanthosia Huegelii*, Steud.; *Melaleuca Huegelii*, Endl.; *Verticordia Huegelii*, Endl.; *Convolvulus Huegelii*, De Vr.—?; *Banksia Huegelii*, Br.—?; *Conospermum Huegelii*, Br.; *Grevillea Huegelii*, Meissn.; *Wikiea Huege-*

liana, A.DC.—*Mollinedia Huegeliana*, Tul.; *Casuarina Huegeliana*, Miq.; *Cyrtostylis Huegelii*, Endl.—*C. reniformis*, R. Br. var. *Huegelii*; *Ficus Huegelii*, Kunth et. Bouch.—?; *Poranthera Huegelii*, Kl.; *Urostigma Huegelii*, Miq.—?; *Cycnogeton Huegelii*, Endl.—*Triglochin procera*, R. Br.

Lehmann, Johann Georg Christian (). Of Hamburg, was the author of a large number of botanical works published between the years 1817 and 1856. That of special interest to Western Australians is:—

“Plantæ preissianæ sive enumeratio plantarum quas in Australasia . . . 1838-41 collegit L. Preiss. Hamburgi,” 1844-7. 2 vols., 8vo.

He is commemorated by the following species:—

Billardiera Lehmanniana, Muell.; *Calandrinia Lehmanni*, Endl.; *Diplopeltis Lehmanni*, Miq.—*D. Huegelii*, Endl.; *Plokiostigma Lehmanni*, Schuch.—*Stackhousia pubescens*, A. Rich.; *Gastrolobium Lehmanni*, Meissn.; *Jacksonia Lehmanni*, Meissn.; *Aster Lehmanni*, F. k. M. *Eurybia Lehmanniana*, Steetz.; *Olearia Heleophila*, F. v. M. var. *major*; *Calothamnus Lehmanni*, Schau.; *Melaleuca Lehmanni*, Schau.—*M. viminea*, Lindl.; *Symphymyrtus Lehmanni*, Schau.—*Eucalyptus Lehmanni*, Preiss.; *Verticordia Lehmanni*, Schau.; *Andersonia Lehmanniana*, Sond.—*A. sprengelioides*, R. Br.; *Halgania Lehmanniana*, Sond.—?; *Lobelia Lehmanni*, De Vr.—*Isotoma Brownii*, G. Don.; *Stylidium Lehmannianum*, Sond.—*S. rupestre*, Sond.; *Banksia Lemmanniana*, Meissn.; *Grevillea Lemmanniana*, Meissn.—*G. concinna*, Br.; *Hakea Lehmanniana*, Meiss.; *Calyptrostegia Lehmanniana*, Endl.—*Pimelea Lehmanniana*, Meissn.; *Casuarina Lehmanniana*, Miq.—*C. humilis*, Ott. and Dietr.; *Leptomeria Lehmanni*, Miq.—*L. pauciflora*, Br.

Lindley, J. (). Prof. Lindley took a great interest in Western Australian plants. He published “A Sketch of the vegetation of the Swan River Colony” (1839). See (5).

Mangles, James (). Captain James Mangles, R.N., and R. Mangles, Esq., are mentioned in “A Sketch of the vegetation of the Swan River Colony” (Lindley, 1839).

There was also a “George Mangles,” like James Drummond, an “Agriculturalist” on the “Parmelia,” with Captain Stirling, at Perth in 1829.

Captain Mangles collected or caused to be collected many interesting West Australian plants, and the following species commemorate him exclusively or R. and George in addition:—

Hovea Manglesii, Lindl.—*H. trisperma*, Benth.; *Helipterum Manglesii*, F. v. M.; *Lophoclinium Manglesii*, Endl.—*Podotheca angustifolia*, Cass.; *Melaleuca Manglesii*, Schau.—*M. scabra*, R.

Br. ; *Rhodanthe Manglesii*, Lindl.—*Helipterum Manglesii*, F. v. M. ; *Acrotriche Manglesii*, Sond.—*A. ramiflora*, R. Br. ; *Anadenia Manglesii*, Grah.—*Grevillea Manglesii*, Hortul.—*G. glabrata*, Meissn. ; *Ptilotus Manglesii*, F. v. M. *Trichinium Manglesii*, Lindl. ; *Anigozanthos Manglesii*, Don. ; *Anigozanthos Manglesii*, Maund.—*A. flavida*, Red. ; *Thysanotus Manglesianus*, Kunth.—*T. Patersoni*, R. Br.

Maxwell, G. . . . (1804-1880). Died in January, 1880, near Albany, W.A., aged 75 years.

"Only two years ago (wrote Mueller to *Gard. Chron.*, 3rd April, 1880, p. 433) I made long journeys with him over rough country for several days on horseback to collect plants and seeds . . . More than 30 years ago he conducted Drummond through the Stirling Ranges in the journey that proved so memorable in the discovery of many splendid plants. He was nearly always in the bush, and engaged in collecting seeds, botanical and entomological specimens. Encouraged by myself, he undertook several extensive journeys over then untrodden ground, eastward as far as the Great Bight, and thus found many new plants and enabled us to extend the known limits of the range of many rare species, as recorded in the "*Flora Australiensis*."

See also B. Fl. i, 14.7

He was an admirable collector whose collections are mainly in the National Herbarium, Melbourne. More deserves to be known of him.

He is commemorated by the following species :—

Eriostemom Maxwellii, F. v. M. ; *Genosiris Maxwellii*, F. v. M. —*Patersonia Maxwellii*, F. v. M. ; *Pimelea Maxwellii*, F. v. M. ; *Poa Maxwellii*, Benth.

Menzies, Archibald (1754-1842). He was surgeon and botanist to Captain Vancouver's expedition of discovery and survey to the N.W. coast of America. He was appointed on the recommendation of Banks, and Menzies' instructions were drafted by Banks.* It will be observed that the instructions were largely botanical and horticultural.

Banks was further consulted† by the Government in regard to the mode of carrying on the survey of the N.W. coast of America.

Under date, Nootka Sound, † 26th September, 1792, Menzies gave Banks a general account of the voyage, including a reference to the newly discovered "King George's Sound," where the "Discovery" stayed a fortnight and where he made a "copious collection of its vegetable productions, principally the Genus *Banksia*, which are here very numerous."

* *Hist. Records of N.S.W.*, i (2), 424.

† *ib.*, p. 456.

† *ib.*, p. 638. There are other letters to and from Menzies in this volume.

" Botanical collector. Born at Weem, Perthshire. Entered as a gardener at the botanic gardens, Edinburgh, and studied surgery at the University there. Became a surgeon in the navy, and was stationed in America, where he joined Captain Vancouver's expedition, 1790-95, visiting the Cape, King George's Sound, New Zealand, the Sandwich and Galapagos Islands, and Valparaiso, from which places he brought back a variety of plants and other specimens of natural history. His account of the voyage appeared in London's *Magazine of Natural History*. He practised for a time in London, where he died. Bequeathed his herbarium to the Botanic Garden, Edinburgh. The genus *Menziesia* was dedicated to him by Sir J. E. Smith. There is at Kew a colored crayon drawing by Eden Upton Eddis. Bust, aged face seen in profile to the left. Dimensions—17½ in. by 13½ in. Hooker Collection." Kew Catalogue of Portraits of Botanists, 1906, p. 84)

The following additional biographical notes are taken from (6).

" Born 15th March, 1754, died London, 15th Feb., 1842. p. F.L.S., 1790. Introduced *Araucaria imbricata*, § 1796. Plants in Herb. Mus. Brit. and at Kew. Imperial Dict. of Univ. Biog.; Smith Corr., ii, 272; Fl. Tasmania, cxiv; Bot. of Geol. Survey of California; 553; *Proc. Linn. Soc.*, i, 139; Laségue, 366; Royal Society's Catalogue, iv, 345. Portr. at Kew, and oil portr. by Eddis at Linn. Soc."

Besides the genus *Menziesia* already referred to, the following species commemorate him:—

Drosera Menziesii, R. Br.; *Utricularia Menziesii*, Br.; *Banksia Menziesii*, Br.; *Leptoceras Menziesii*, Lindl.—*Caladenia Menziesii*, R. Br.; *Thysanotus Menziesii*, Br.—*T. Patersoni*, R. Br.

Morrison, William (). Native of Scotland, was at Kew in 1824. He went to Barbados to superintend a sugar plantation. He visited Trinidad, and returning to England in 1828 brought a large collection of seeds, plants and dried specimens. Many of the Western Australian Proteaceæ were introduced to Kew through Morrison.

" In founding Swan River Colony in 1828, Capt. Stirling, the Governor, took with him William Morrison, a gardener, who became a seed collector, and forwarded collections to this country for sale" [Records of the Royal Botanic Gardens (Kew), by John Smith, 1880, p. 10].

See also *Kew Bull.*, 1891, p. 317.

Mylne, — (). In the fifties he collected seaweeds in W.A. See Harvey in "*Nereis Australis*" and "*Phycologia Australica*." His specimens are represented in Herb. Lemann (Cambridge) and other herbaria.

§ For a full account of the memorable introduction of this Chili Pine, see *Kew Bulletin*, 1891, p. 299.

He is also commemorated by *Hibbertia Mylnei*, Benth.

Oldfield, Augustus ().

" Mr. A. Oldfield (now, 1859, I believe in Western Australia) has carefully investigated the Flora of several parts of Tasmania, and especially of the Huon River, and has also ascended some of its loftiest mountains. His name will be repeatedly found in the Tasmanian Flora, both as a zealous collector and as a careful and acute observer " (2).

" Augustus Oldfield, an acute observer as well as an intelligent collector, who, besides the Tasmanian contributions mentioned in Dr. Hooker's Flora, made large additions to the West Australian plants previously known; in the first instance from the neighbourhood of the Murchison River, and afterwards from the south-western districts. Mr. Oldfield is now (1863) in this country, and has most generously offered the use of his own Australian herbarium to the Kew Museum, as a contribution to the present Flora " (B. Fl., i, 14*).

In addition to the localities given above, Oldfield collected at Twofold Bay, New South Wales, but whether he made a long stay there or whether he was a mere visitor to this port, which is commonly touched at by Tasmanian vessels, chiefly from Launceston, I do not know.

The following species commemorate him:—

Eriostemon Oldfieldi, F. v. M.—*Phebalium Oldfieldii*, F. v. M.; *Lasiopetalum Oldfieldi*, F. v. M.—*L. acutiflorum*, Turcz. var. *Oldfieldi*; *Acacia Oldfieldii*, F. v. M.—*A. acuminata*, Benth.; *Calothamnus Oldfieldii*, F. v. M.; *Calythrix Oldfieldii*, Benth.; *Darwinia Oldfieldii*, Benth.; *Eucalyptus Oldfieldii*, F. v. M.; *Helichrysum Oldfieldii*, F. v. M.—*Helipterum Cotula*, DC.; *Lamprochilana Oldfieldii*, F. v. M.—*Myriocephalus nudus*, A. Gray. var. *Oldfieldii*; *Melaleuca Oldfieldii*, F. v. M.; *Leucopogon Oldfieldii*, Benth.; *Scarola Oldfieldii*, F. v. M.; *Solanum Oldfieldii*, F. v. M.; *Chloanthes Oldfieldii*, F. v. M.—*Pityrodia Oldfieldi*, F. v. M.; *Eremophila Oldfieldii*, F. v. M.; *Hakea Oldfieldii*, Benth.; *Quoya Oldfieldii*, F. v. M.—*Pityrodia Oldfieldii*, F. v. M.; *Encephalartos Oldfieldii*, Miq.—?; *Macrozamia Oldfieldii*, Miq.—?; *Monotaxis Oldfieldii*, Baill.—*M. lurida*, Benth.; *Lepidosperma Oldfieldii*, Hook.; *Luzula Oldfieldii*, Hook. f.

Preiss, Ludwig (). See Lehmann, supra p.

" In 1838, Dr. Ludwig Preiss arrived at Swan River, and resided there for four years, travelling often with Mr. Drummond, and collecting largely. His plants were sold in numbered sets, and a complete account of them was published by various authors, in two octavo volumes, edited by Dr. Lehmann, of Hamburg, and containing upwards of 2,000 species, including Cryptogamia " (2).

He is commemorated by the following plants:—

Candollea Preissiana, Steud.; *Cheiranthra Preissiana*, Putterl.—?; *Commersonia Preissii*, Steud.—*Rulingia corylifolia*, Grah.; *Diplopeltis Preissii*, Miq.—*D. Huegelii*, Endl.; *Dodonaea Preissiana*, Miq.—*D. attenuata*, A. Cunn.; *Malva Preissiana*, Miq.

Lavatera plebeia, Sims ; *Oxalis Preissiana*, Steud.—*O. corniculata*, Linn. ; *Tetralthea Preissiana*, Steetz. *T. pilifera*, Lindl. ; *Acacia Preissiana*, Lehm.—*A. obscura*, A. DC. ; *Aotus Preissii*, Meissn. ; *Bossia Preissii*, Meissn. ; *Daviesia Preissii*, Meissn. ; *Dillwynia Preissii*, Benth. ; *Gastrolobium Preissii*, Meissn.—*G. spinosum*, Benth. ; *Gompholobium Preissii*, Meissn. ; *Meionectes Preissii*, Nees—*M. Brownii*, Hook. f. ; *Sondera Preissii*, Lehm.—*Drosera heterophylla*, Lindl. ; *Viminaria Preissii*, Meissn. ? ; *Aster Preissii*, F. v. M.—*Olearia heleophila*, F. v. M. ; *Babingtonia Preissiana*, F. v. M.—*Bæckeia pentandra*, F. v. M. ; *Calothamnus Preissii*, Schau. ; *Cymbonotus Preissianus*, Steetz.—*C. Lawsonianus*, Gaudich. ; *Dimetopia Preissii*, Bunge—*Trachymene pilosa*, Sm. var. *Preissiana* ; *Eucalyptus Preissiana*, Schau. ; *Kunzea Preissiana*, Schau. ; *Loranthus Preissii*, Miq. *L. linophyllus*, Fenzl. ; *Melaleuca Preissiana*, Schau. ; *Pumilo Preissii*, Sond.—*Rutidosis Pumilo*, Benth. ; *Skirrophorus Preissianus*, Steetz.—*Angianthus Preissianus*, Benth. ; *Tetrapora Preissiana*, Schau.—*Bæckeia pentandra*, F. v. M. ; *Verticordia Preissii*, Schau. ; *Brachyloma Preissii*, Sond. ; *Campanula Preissii*, De Vr.—? ; *Coleostylis Preissii*, Sond. *Levenhookia Preissii*, F. v. M. ; *Conostephiopsis Preissii*, Stschegl. *Conostephium Preissii*, Sond. *Styphelia Preissii*, F. v. M. ; *Convolvulus Preissii*, De Vr.—? ; *Dampiera Preissii*, De Vr.—? ; *Forsteropsis Preissii*, Sond.—*Stylidium Preissii*, F. v. M. ; *Halgania Preissiana*, Lehm. ; *Levenhookia Preissii*, F. v. M. ; *Tetralobus Preissii*, A. DC.—*Polypompholyx multifida*, F. v. M. ; *Utricularia Preissii*, A. DC.—? ; *Wahlenbergia Preissii*, De Vr.—? ; *Dryandra Preissii*, Meissn. ; *Grevillea Preissii*, Meissn.—*G. Thelemanniana*, Endl. ; *Hakea Preissii*, Meissn. ; *Rhagodia Preissii*, Moq. ; *Synaphea Preissii*, Meissn. ; *Trichinium Preissii*, Nees *T. alopecuroidium*, Lindl. ; *Anigozanthos Preissii*, Endl. ; *Caladenia Preissii*, Endl.—? ; *Callitris Preissii*, Miq.—*Frenela robusta*, A. Cunn. ; *Casuarina Preissiana*, Miq.—*C. humilis*, Otto and Dietr. ; *Choretum Preissianum*, Miq.—*Leptomeria Preissiana*, A. DC. ; *Conostylis Preissii*, Endl. ; *Encephalartos Preissii*, F. v. M. ; *Macrozamia Preissii*, Lehm.—*Macrozamia Fraseri*, Miq. ; *Phyllanthus Preissianus*, Kl.—*P. calycinus*, Labill. ; *Pimelea Preissii*, Meissn. ; *Pimelea Preissii*, Schlecht—*P. glauca*, R. Br. ; *Santalum Preissianum*, Miq.—*Fusanus acuminatus*, R. Br. ; *Acanthocarpus Preissii*, Lehm. ; *Arnocrinum Preissii*, Lehm. ; *Arthropodium Preissii*, Endl. ; *Baumea Preissii*, Nees—*Cladium Preissii*, F. v. M. ; *Carex Preissii*, Nees. ; *Cheilanthes Preissiana*, Kunze—*C. tenuifolia*, Swartz. ; *Cladium Preissii*, F. v. M. ; *Cladium Preissii*, F. v. M.—*Gahnia decomposita*, Benth. ; *Eriachne Preissiana*, Nees.—*E. ovata*, Nees. ; *Gahnia Preissii*, Nees.—*G. decomposita*, Benth. ; *Lachnagrostis Preissii*, Nees.—*Deyeuxia Forsteri*, Kunth. var. *Preissii* ; *Lepidobolus Preissianus*, Nees. ; *Mesomelæna Preissii*, Nees.—*M. stygia*, Nees. ; *Selaginella Preissiana*,

Spring.; *Xanthorrhæa Preissii*, Endl.; *Xerotes Preissii*, Endl.; *Zannichellia Preissii*, Lehm.—*Lepilæna Preissii*, F. v. M.

Harvey, in his "Phycologia Australica," records the following sea-weeds bearing his name:—*Plocamium Preissianum*, Sond.; *Halophegma Preissii*, Sond.; *Calliblepharis Preissiana*, Ag.

Purdie, Alexander (1859-1905). Born at Edinburgh 23rd October, 1859. Left Scotland in infancy and was educated at Dunedin, New Zealand. Died at Perth, West Australia, 17th July, 1905. Buried at Karrakatta.

He was M.A. of the New Zealand University, and successively Associate of the Otago University School of Mines, Lecturer in Chemistry, Assaying and Metallurgy in the Bendigo School of Mines, and formerly Professor of Mining and Geology in the Ballarat School of Mines. At the time of his death he was Director of Technical Education in W.A. and Lecturer in Chemistry, Assaying, &c., at the Perth Technical School. Mr. Purdie, as regards botany, worked chiefly at Orchids.

He published a "List of Orchids collected near Sale (Victoria) by the Misses May and Lilian Wise and Muriel Bennett," in *Vict. Nat.*, x, 45.

He gave a lecture on "Our Native Orchids" before the Mueller Botanic Society, 24th September, 1900, illustrated with lantern slides. This lecture is given at part 8 of the *Proc. Mueller Bot. Soc. W.A.*, with blocks from his lantern slides. The lecture is an admirable one and shows alike the depth of his knowledge of the subject and his power as a teacher in clearly presenting his facts.

He delivered a second lecture entitled "The Epacridaceæ or Australian Heaths on 9th June, 1902," see Part 10 *op. cit.*, an admirable illustrated discourse also.

He is commemorated by —:

Boronia Purdieana, Diels, and *Grevillea Purdieana*.

I am much obliged to Dr. Alex. Morrisson, formerly Government Botanist of W.A., for his kindness in procuring me certain biographical details of Mr. Purdie.

Roe, J. . . . S. ().

"In 1848 a journey of discovery into the interior of south-western Australia was undertaken by J. S. Roe, Esq., Surveyor-General, during which excellent collections of plants were made and transmitted to Sir W. Hooker. Mr. Roe started from Cape Riche, and proceeded north-east to the Bremer Range, lat. 25° 35' south, long. 120° 30' E., and then south-east to Russell Range, whence he returned parallel to the south coast. The narrative of this journey, which contains much botanical information, was published in the 'Kew Journal of Botany,' vol. VI, 1854" (2).

According to Mr. Malcolm A. C. Fraser in 1830, Lieut. J. S. Roe, R.N., Surveyor-General, started on an exploring expedition in the vicinity of Cape Naturaliste, Port Leschenalt, and between the Collie and Preston Rivers.

In 1831 with Sir James Stirling in H.M.S. "Sulphur," he surveyed on the south coast.

In 1835 he was at the heads of Kalgan and Hay Rivers.

See also "J. S. Rose's Journeys in W.A." (Hooker's *Journ. Bot.*, vi) above referred to.

See also "An historical review of the Explorations of Australia," Mueller (*Trans. Phil. Soc. Vict.*, ii, p. 159).

In figuring and dedicating *Polysiphonia Roeana*, Harv., Harvey, in "Phycologia Australica" says in honour of J. S. Roe, Esq., R.N., Sur-Genl. of W.A., in which capacity he has explored many distant portions of the colony, and though not a botanist, never neglects an opportunity of promoting botanical researches.

He is also commemorated by the following species:—

Pittosporum Roeanum, Putterl.—*P. phylliræoides*, DC. ; *Glichrocaryon Roei*, Endl.—? ; *Loudonia Roei*, Schlecht. ; *Leptospermum Roei*, Benth. ; *Verticordia Roei*, Endl.—? ; *Conostephium Roei*, Benth. ; *Anadenia Roei*, Endl. ? ; *Didymanthus Roei*, Endl. ; *Hakea Roei*, Benth. ; *Petrophila Roei*, Endl. ? ; *Trichinium Roei*, F. v. M. ; *Caladenia Roei*, Benth. ; *Frenela Roei*, Endl. ; *Patersonia Roei*, Endl.—? ; *Laxmannia Roei*, Endl.—*L. minor*, R. Br.

Sanford, W. Ashford (), of Nynhead Court, Somerset, Colonial Secretary of Western Australia, collector of seaweeds.

Asparagopsis Sandfordiana, Harv., a West Australian seaweed, was figured in "Phycologia Australica."

Schauer, Johann Conrad (). See his works "Chamælaucieæ . . . Diss," Vratislaviæ (1841), 4to.

"De Regelia, Beaufortia et Calothamno." Diss, Vratislaviæ (1843). 4to.

"Dis sertatio Phytographica de Regelia, Beaufortia et Calothamno generibus plantarum Myrtacearum" (Bonn, 1845). All on W.A. plants.

See other works in Pritzel's *Thesaurus*.

The following species commemorate him:—

Beaufortia Schaueri, Preiss ; *Calothamnus Schaueri*, Lehm. ; *Kunzea Schaueri*, Lehm.—*K. capitata*, Reichb.

Stirling, James (). Capt, R.N. First Lieut.-Governor of the Swan River Settlement, his appointment bearing date 30th December, 1828. See Malcolm A. C. Fraser's Year-book (1902-4), p. 16.

He advanced the study of Western Australian plants by every means in his power, and had Mr. Fraser, Superintendent of the Botanic Gardens, Sydney, with him in the "Success" when he explored the Swan River and recommended its settlement.

He is commemorated by :—

Physolobium Stirlingii, Benth.—*Kennedya Stirlingii*, Lindl. ; *Trichinium Stirlingii*, Lindl.

Toward, D. . . . (). Gardener to R.H. the Duchess of Gloucester. He cultivated Western Australian plants and herbarium specimens bearing his name are occasionally seen in herbaria. He is mentioned, *Lindley Swan R. App.*, 1839.

Turczaninow, Nicolaus (). A Russian botanist who purchased Drummond's and other collections and described many of the plants contained in them. He published a number of new species in *Bull. Phys. Mathem. Acad. Sc.*, St. Petersburg.

He is commemorated by the following species :—

Eriostemon Turczaninowii, Muell.—*Crocea angustifolia*, Turcz. ; *Aster Turczaninowii*, F. v. M. *Olearia Turczaninowii*, F. v. M.—*O. imbricata*, Benth. ; *Cyanostegia Turczaninowii*, F. v. M.—?

Walcott, Pemberton (). In Mr. Francis (T.) Gregory's expedition to the N.W." (B.H.), 1861. See "Expedition to the North-West Coast of Australia by F. T. Gregory," *Proc. R.G.S.*, 1862, pp. 372-429, with map.

"Mr. P. Walcott joined as a volunteer for the collection of specimens of natural history and botany."

The leader at p. 429 speaks most highly of Mr. Walcott's services.

He is commemorated by the following species :—

Corchorus Walcottii, F. v. M. ; *Tinespora Walcottii*, F. v. M. ; *Diplolobium Walcottii*, F. v. M. *Swainsona occidentalis*, F. v. M. ; *Anthotroche Walcottii*, F. v. M. ; *Lachnostachys Walcottii*, F. v. M.

Walter, T. . . . R. C. (). Author of a paper, "Notes on a poisonous leguminous plant from Swan River, Australia" (*Tas. Journ.*, 3, 312, 1849). I know nothing further about him.

Webb, W. . . . (), Albany. Collector of seeds and botanical specimens, and successor of Maxwell in this business.

Wilson, Thomas Braidwood (). Born in the parish of Ephall, Scotland. Surgeon in the Royal Navy. He was cast away in Torres Strait and eventually visited the northern settlement at Melville Island from Java, which he and others reached in boats. From Melville Island he sailed to Western

Australia. In 1829 he explored the river near King George's Sound and discovered the river Denmark. He was a Surgeon-Superintendent of convict ships, and made many voyages to Tasmania and New South Wales.

He was the author of "Narrative of a voyage round the World" (London, 1835), which contains much valuable information in regard to the aborigines and Australia.

He settled down at Braidwood, N.S.W., the township having been named after him by the then Governor, Sir Richard Bourke.

He was a friend of Allan Cunningham and brought seeds and roots of many W.A. plants to his friend at the Sydney Botanic Gardens.

He is commemorated by *Grevillea Wilsoni*, A. Cunn., the seeds of which he brought from W.A. to Allen Cunningham.

I am indebted to his son-in-law, Mr. S. M. Morole, formerly Usher of the Black Rod (N.S.W. Parliament) for some of the above information.

RECORDS OF Australian Botanists

who have dealt with the Flora of Western Australia

BY

J. H. MAIDEN,

Government Botanist and Director of the Botanic Gardens,
Sydney.

*(Being excerpts from a paper read before the Royal Society
of New South Wales, July 1st, 1908).*

Backhouse, James (1794-1869). Born 8th July, 1794; died at York, England, 20th January, 1869. Nurseryman. Botanised in Teesdale, Yorkshire, etc., 1803-65. Missionary friend in Norway and the Southern Hemisphere. Correspondent of J. E. Smith and W. J. Hooker.

Backhouse was an admirable botanist and collected in *every Australian* colony and also in Norfolk Island. I have given an account of his South Australian work in (v), where is a list of species which commemorate him. He wrote the following, which contain many valuable botanical observations:—"Extracts from the letters (and journal) of J. B. . . in Van Diemen's Land and New South Wales (Australia, Mauritius, South Africa), accompanied by G. W. Walker." London, 1838-41, 8vo. "A narrative of a visit to the Australian Colonies." London, 1843, 8vo. "A narrative of a visit to Mauritius and South Africa." London, 1844, 8vo. At Kew there is a MS. volume labelled "Backhouse, James, Botany of New South Wales" (2 vols. fol.).

Bentham, George (1800-84). Born at Stoke, Plymouth, England, 22nd September, 1800; died in London, 10th September, 1884. As to Bentham's share in the "Flora Australiensis," a work which has laid Australian botanists under an eternal obligation to him, he says the work "is entirely and

exclusively mine, with the assistance indeed, but not the co-operation, of Baron von Mueller." For biographical references to this eminent man see *Nature*, xxx, 539-43; *Proc. Royal Society*, xxxviii, i-v; Asa Gray's "Bentham" in *Proc. Amer. Acad. of Arts and Sci.*, xx, 527 (1884), reprinted in Sargent's "Scientific papers of Asa Gray" (1889); Dyer's Eulogium in *Proc. Linn. Soc.* (1887-8), p. 71; Britten and Boulger, p. 14. But especially see the admirable "Life of Bentham," by B. Daydon Jackson, in the "English Men of Science" Series (1906); this contains a valuable bibliography of his works. Benthamiana are enumerated in the *Cat. of Kew Library* (Bulletin, Additional Series, iii, 1899), pp. 42, 43.

The following Australian species commemorate him :—

Colobanthus Benthamianus, Fenzl.—*C. subulatus*, Hook. f.; *Olax Benthamiana*, Mig.; *Acacia Benthami*, Meissn.—?; *Daviesi Benthamii*, Meissn.—*D. incrassata*, Sm.; *Pultenaea Benthamii*, F. v. M.; *Spadostyles Benthamii*, Endl.—*Pultenaea humilis*, Benth.; *Weinmannia Benthami*, F. v. M.; *Scaevola Benthamia*, De Ur.—*S. striata*, K. Br.; *Microlis Benthamiana*, Reichb.—?; *Thelmitra Benthamiana*, Reichb.—?

Brown, Robert (1773-1858). *Botanicorum facile princeps* (Humboldt). The founder of Australian systematic botany. Born at Montrose, Scotland, 21st December, 1773, died in London, 10th June, 1858. Educated at Marischal College, Aberdeen. Joined the army as a surgeon, 1795 and corresponded with Sir Joseph Banks on botanical matters. The latter appointed him naturalist to Flinders' voyage of discovery to Australia in the "Investigator." In Australia 1802-5. Speaking of Brown's researches on Australian plants, Hooker says :—

"Hence, when we regard the interest and novelty of the field of research, the rare combination of qualities in the botanist, and the advantages and facilities which he enjoyed, we can easily understand why the botanical results should have been so incomparably greater, not merely than those of any previous voyage, but than those of all similar voyages put together."

Author of "Prodromus Floræ Novæ Hollandiæ," styled "Opus aureum" in Germany. See Hooker's Eulogy of Brown in *Proc. Linn. Soc.* 1887-8, pp. 54-67. Botanist-librarian to Sir Joseph Banks, 1810-20, then legatee of Sir Joseph's noble herbarium and library, with reversion to the British Museum. Brown became keeper of Botany to that institution in 1827. For further particulars of this eminent man, whose memory all Australians should revere, see my forthcoming "Life of Sir Joseph Banks."

Harvey, William Henry (1811-1866). M.D., F.R.S., F.L.S. Born at Summerville, near Limerick, February, 1811. Went to school at Ballitore, Co. Kildare, the master of which was an

accomplished botanist. Sailed in 1835 for Cape Town and studied the botany of South Africa. Returned to England in 1842, and became the leading authority on algæ. Hon. M.D. of Dublin and Curator of the Herbarium of Trinity College, 1844; and succeeded, in 1856, to the Chair of Botany at the University. In 1849 he visited the United States, and between 1853-6 India, Australia and the South Sea Islands. Author of "Genera of S. African Plants," 1838; "Manual of British Algæ," 1841; "Phycologia Britannica," 1846-51; and numerous other works. Died at Torquay. The genus *Harveya* was dedicated to him. At Kew there is a colored crayon drawing of him by Sir Daniel Macnee, P.R.S.A., also a bust, seated, clean shaven, face three-quarters to the left. Dimensions 17½ in. by 13¾ in. Hooker collection. Also a lithograph, 1850, by T. H. Maguire. Half length, seated, holding a book, face three-quarters to the right. Autograph (facsimile) (8).

"In 1854 he visited Australia for the purpose of investigating the Algology of its shores; he landed at King George's Sound, went overland to Swan River and Cape Riche, then to Melbourne, Tasmania, and Sydney, forming magnificent collections of Algæ, many of which have been published in the "Phycologia Australica," in this work, and elsewhere." (3).

In addition to the works already enumerated, see "Nereis australis; or Algæ of the Southern Ocean, etc." London, 1847, 8vo. "Some account of the marine botany of the Colony of Western Australia" (*Trans. R. Irish Acad.* xxii). Dublin, 1855, 4to. "Phycologica australica: or a History of the Australian Seaweeds, etc." London, 1858-63, 5 vols., 8vo. See also his papers on the Algæ of Tasmania, *Tas. Journ.*, Vol. II, pp. 377i 421, 1846; Vol. III, pp. 55, 153, 239, 1849. See also an obituary notice in *Seemann's Journ. Bot.* 1866, 236, also "Memoir of W. H. Harvey, M.D., F.R.S." (London, 1869), with a portrait. Chapters xiii and xiv are devoted to his botanical travels in Australia, where plants other than sea-weeds also engaged his attention. He is commemorated by the following Australian plants:—

Sarcopetalum Harveyanum, F. v. M.; *Acacia Harveyi*, Benth.; *Seseli Harveyanus*, F. v. M.; *Verticordia Harveyi*, Benth.; *Caulerpa Harveyi*, F. v. M., a sea-weed figured in "Phycologia australica."

of the 2nd edition, of which he was practically the author, although it is customary to refer to the new plants described in that work as Aiton's. The only purely Australian botanical work published by Dryander is "Chloris Novæ Hollandiæ, or Catalogue of the Plants of New Holland and Van Diemen's Land hitherto published, as far as they have come to the knowledge of J. Dryander." (*Ann. Bot. of König and Sims*, ii, 504-32, 1806). Robert Brown acknowledges his indebtedness to Dryander.

Further details concerning the latter will be found in my forthcoming "Life of Banks." He is commemorated in the Protaceous genus *Dryandra* and in *Grevillea Dryandra*, R. Br.

Kippist, Richard (1812-1882). Born at Stoke Newington, London, 11th June, 1812; died at Chelsea, London, 14th January, 1882. Entered the service of the Linnean Society in 1830, and in 1842 was chosen librarian, which post he filled till 1881. He did not publish much, but he always took an interest in Australian plants and assisted Bentham, Mueller and other workers at such plants with his advice. Biographical notices of him will be found in *Proc. Linn. Soc.*, 1880-2, p. 64, and "Nature," 19th January, 1882. See also (1). His works include:—"On Janzonina, a new genus of Leguminosæ from Western Australia," *Trans. Linn. Soc.*, xx, 383. "On Acradenia, a new genus of Diosmæ," *ib.* xxi, 207, and he is commemorated in the Australian genus *Kippistia*, F. v. M.—*Minuria*, also in *Dryandra Kippistiana*, Meissn.; *Hakea Kippistiana*, Meissn.

Lindley, John (1799-1865). Ph.D., F.R.S., F.L.S. Botanist and horticulturist. Born at Catton, near Norwich, where his father was a nurseryman, and educated at Norwich Grammar School. Assistant Librarian to Sir J. Banks, when he published *Rosarum Monographia*, 1820, *Collectanea Botanica* and *Digitalium Monographia* in 1821; assistant secretary of the Royal Horticultural Society, 1822, first professor of botany at the University of London, 1829, and lecturer on botany to the Apothecaries Company, 1836. It was on his recommendation that Kew Gardens were acquired for the nation. He published many works. Member of the Institute of France. Died at Turnham Green, London (8). See also (1). There is a reproduction of the portrait of Lindley by Eddis in the Royal Horticultural Society's room at fig. 44, *Journ. R. H. S.*, xxix (Dec., 1904), also of the Lindley meadl.

"Dr. Lindley's able sketch of the vegetation of the Swan River Colony published in 1839, as an appendix to the 'Botanical Register,' is founded chiefly on Drummond's collections; and it contains a good account of many of the features of the climate of the Colony, many extremely valuable botanical notes on the plants, and figures of eighteen. Dr. Lindley records his obligations to Captain Mangles, R.N., and R. Mangles, Esq., and notices a paper on Western Australia by Dr. Milligan, published in the *Mudras Journal* for 1837." (3).

Lindley also named the specimens collected on Mitchell's Third Expedition. He was for many years deeply interested in Australian plants, of which he described a large number. He is commemorated in the following Australian plants:—

Dodonæa Lindleyana, F. v. M.—*D. triangularis*, Lindl.; *Hibiscus Lindleyi*, Wall.—? *Acacia Lindleyi*, Meissn.; *Byblis Lindleyana*, Planch.—*B. gigantea*, Lindl.; *Hardenbergia Lindleyi*,

Meissn.—*H. Comptoniana*, Benth.; *Eucalyptus Lindleyana*, DC.—*E. amygdalina*, Labill; *Eupatorium Lindleyanum*, F. v. M.—*E. cannabinum*, Linn.; *Verticordia Lindleyi*, Schau.—*V. Drummondii*, Schau., var. *Lindleyi*; *Dampiera Lindleyi*, De Vr.—*D. alata*, Lindl.; *Stylidium Lindleyanum*, Sond.—*S. calcaratum*, R. Br.; *Styphelia Lindleyi*, F. v. M.—*Conostephium minus*, Lindl.; *Atriplex Lindleyi*, Mog.—*A. halimoides*, Lindl.; *Banksia Lindleyana*, Meissn.; *Dryandra Lindleyana*, Meissn.—?; *Grevillea Lindleyana*, Meiss.—*G. Wilsoni*, Cunn.; *Philotus Lindleyi*, F. v. M.—*Trichinium obovatum*, Gaudich; *Eriochilus Lindleyi*, Endl.—?; *Pimelea Lindleyana*, Meiss.—*P. spathulata*, Labill. (partly); *P. linifolia*, Sm. (partly); *Tribonanthus Lindleyana*, Endl.—*T. longipetalia*, Lindl.; *Arthropodium Lindleyi*, Kunth—*A. paniculatum*, R. Br.; *Sporobolus Lindleyi*, Benth.; *Thysanotus Lindleyanus*, Endl.—*T. dichotomus*, R. Br.; *Vilfa Lindleyi*, Steud.—*Sporobolus Lindleyi*, Benth.

Mueller, Ferdinand (1825-1896). Born Rosloch, Germany, 30th June, 1825; died at Melbourne 10th October, 1896. Arrived in Adelaide, 1847, and went to Melbourne in 1852 to fill the newly-created post of Government Botanist of Victoria. He began his Victorian botanical explorations in 1853, and in 1856 explored north-western and northern Australia under the leadership of A. C. Gregory, returning with a rich harvest of new plants. In 1857 the Directorship of the Botanic Gardens at Melbourne was conjoined to his office of Government Botanist, and separated from it in 1873. He died in harness, as Government Botanist of Victoria. His official life was synchronous with a renewed development of botanical science in Australia. He assisted Bentham in the preparation of the *Flora Australiensis*. He wrote the "Eucalyptographia," "Iconography of Australian species of Acacia," the "Fragmenta phytographiæ Australiæ the," "Census of Australian Plants," and many works too numerous to mention at this place. He was elected a Fellow of the Royal Society in 1861; the King of Wurtemberg created him a Baron in 1871; in 1879 he was created a K.C.M.G. Biographical details may be obtained in the following:—Hooker (**3**); Henniker Heaton, "Dictionary of Dates"; Mennell (**6**); "Men of the Time in Australia," Victorian series, 2nd edition, 1882. The following appreciations were written after his death:—Woolls, William, *Sydney Mail*, 17th October, 1896; Spencer, W. Baldwin, *Victorian Naturalist*, xiii. October, 1896; Deane, Henry, *Proc. Linn. Soc., N.S.W.*, xxi, 823 (1896); Maiden, J. H., *Proc. Roy. Soc., N.S.W.*, xxxi, 38-43 (1897); also, *Trans. Aust. Assoc. Adv. Science*, Adelaide Meeting, 1907; Norton, James, *Proc. Linn. Soc., N.S.W.*, xxv, 778 (1900). A bibliography of his works (some of his smaller writings are scattered throughout the world in publications difficult of access), to include, perhaps, reprints of some

of his rarer contributions to science, would form a durable and valuable memorial of Mueller, a suggestion originally made by me in *Proc. Roy. Soc., N.S.W.*, xxxi, 41. On 26th November, 1901, there was unveiled a Memorial to him in the St. Kilda General Cemetery, Melbourne, by His Excellency the Earl of Hopetoun, Governor-General, and I made the following address on the occasion:—

"I attend this function by instruction of the Chief Secretary as Government Botanist of New South Wales, and as President of the Linnean Society of that State as a delegate from the Society, by request of the Council. The last resting place of the greatest Australian botanist of recent times is classic ground. To many of our citizens this beautiful monument will be a remembrance of Mueller, who did so much to diffuse a knowledge of its vegetation, but the botanist requires no such adventitious aid, for as long as there are plants in Australia, the name of Mueller will be remembered in connection with them. He is the last of a trio of distinguished men who have studied Australian plants in Australia itself. I do not refer to the immortal Bentham in this connection, but the names of Robert Brown and Allan Cunningham are inseparably bound up with the elucidation of the flora of this continent. As Lord Rosebery said of Mr. Gladstone, who had not long passed away, 'We are too close to the mountain to grasp its true proportions,' so I would say of our late friend, that we cannot yet fully realise his achievements. Personally, I place him second only to Robert Brown, the 'Facile princeps botanicorum' of Humboldt. He is the last of the botanists of the whole continent of Australia; those of us who carry on his work are provincial botanists, confining our researches more or less to one State. We find the botanical work of one State sufficiently engrossing, and thus in botanical matters we are reversing the act of federation, which politically unites all our peoples. But our provincial arrangements is one of convenience only. We are all happily working to a common end. Apart from his intellectual greatness the industry of Mueller was prodigious. The clock was never used by him as an indicator to cease his labors; he seemed to aim at perpetual motion, and now this silent monument points to rest. He was a public servant who did not work for his pay; a portion of this satisfied his modest personal requirements; the rest was spent by him in the furtherance of his studies. He well advertised Australia in the best sense, and while I think his memory will long be green in his adopted country, he is affectionately remembered in other parts of the world, as I can testify. Personally, I owe much to my late master, and I have often gratefully acknowledged my indebtedness to him. Much of my life is spent in gardens or in traversing the bush for the purpose of botanical exploration. Though alone in my wanderings, the memory of my late friend is often with me; different plants remind me of Mueller's work in various ways. To me the beautiful lines of Tennyson's 'In Memoriam' have a deep and special significance, as I think of the great man in whose honor we are met on this beautiful November day:—

I climb the hill: from end to end
Of all the landscape underneath,
I find no place that does not breathe
Some gracious memory of my friend;
Nor runlet trickling from the rock;
Nor pastoral rivulet that swerves
To left and right thro' meadowy curves,
That feed the mothers of the flock;
But each has pleased a kindred eye,
And each reflects a kindlier day;
And, leaving these, to pass away,
I think once more he seems to die."

AN OBJECTION TO

the Direct Continuity of the Germ-Plasm, with a suggestion as to the part possibly played by Hormones in Heredity.

By J. BURTON CLELAND, M.D.,

Government Pathologist, Western Australia.

Read before the Society 22nd September, 1908.

In discussing the nature of Heredity and the possibility of the transmission of acquired characters to offspring, biologists have been inclined to lay much stress upon the fact that the germ cells are differentiated from the rest of the somatic cells at such an early stage in the development of the individual (thereby severing, as it were, direct connection with the parent) that it would be impossible for them to inherit traits, acquired in extra-uterine life, for instance, from such parent. Carrying this hypothesis further back, it follows that no characteristics could be gradually acquired by the somatic cells of any particular race, species, genus or even family of animals and transmitted to their offspring, unless such were acquired at a very early stage in embryonic life. In other words, on this theory, heredity, as ordinarily understood, is entirely a mistaken phenomenon. The individual is merely a protecting and nourishing envelope for the continuity of the germ plasm for all time and each individual has practically no share at all in shaping its offspring or transmitting to it its own characters. Let me illustrate this as follows: A silk-worm spins a cocoon; the pupa emerges as a moth, which lays eggs; these hatch and eventually each forms a cocoon. The living tenant in this case would represent the continuity of the germ plasm, the cocoon representing the individual. Adherents to this school hold that offspring are like parent, not because they inherit traits from the parent but because the same kind and particular quality as it were or strain of germ plasm produces similar excrescences or side-buds to protect and nourish itself. Slight variations in the germ plasm from time to time would cause corresponding slight variations in the side-bud (*i.e.*, the individual), the unfit amongst which would perish (with accompanying death of the germ-plasm), while the more fit would survive.

Now any really tenable view as to the nature of heredity must be equally applicable to the lowest forms of life and to plants as to the higher animals. Will this view hold in these two instances?

Amongst the protozoa it is held that after a certain number of asexual generations a sexual union of individuals is necessary for the continuance of the life of the race. Here all the asexual generations following on a sexual union and between it and the next preparation for a sexual union of the descendants represent the soma or individual of the higher animals, though each lives an individual life. Here there cannot be any setting aside at an early stage of special germ cells, but each cell dividing into two transmits its characters to its descendants until finally at the end two and two unite in sexual union.

Again, take the case of a pollard eucalypt. It is cut off near the base. But all the germ cells were presumably, if they were set aside early in the life of the individual, situated in the buds, etc., of the part cut away. Does it cease flowering, however, when it grows up again after being cut back? Not at all. In other words, new germ cells have been developed out of ordinary somatic cells late in the life of the individual and out of cells never originally destined for such purpose. Similar phenomena are seen in beans whose buds are nipped off, or cabbages whose heads are removed, and so on.

In other words, here are two instances in which heredity manifestly plays a part and yet the germ cells are only differentiated after many divisions of ordinary somatic cells. These instances do not, of course, annihilate the other theory, though they make one hesitate much about the direct continuity of the germ plasma itself and the denial of the transmission of hereditary characters from the individual itself to its offspring. A new and perhaps better explanation of the wonderful phenomena of heredity and of the apparent "transmission" of characteristics gradually acquired by a species and transmitted to the offspring (though the variation is so small in two generations that it cannot be detected perhaps) is a theory that arose during a discussion between Mr. A. G. Thacker, Dr. Charles Ham and myself at the London Hospital some three and a half years ago. Prof. Starling had recently announced the discovery of "hormones," bodies secreted by one set of cells to make other cells do certain work. I may give as an illustration the following:—An extract of foetal kittens injected subcutaneously over some months into a virgin tabby cat, causes the mammary gland to enlarge and lactate just as if the cat were pregnant. In other words, a hormone present in unborn kittens, passing into the maternal circulation, reaches the mammary gland and there stimulates it to enlarge

and lactate. Then came the suggestion that perhaps in hormones lay the whole secret of development and following on that of heredity. Transmitted from the parent and stored up in the sex cells, these hormones would appear in the fertilized ovum. Then one after the other could be called into play as tissue after tissue had to be laid down until eventually as the result of their combined action, the new individual appeared complete. Naturally slight alterations in the hormones of any particular individual being transmitted to his germ cells and so to the offspring would make the offspring more or less resemble the parent, and, further, acquired characteristics would eventually be transmitted in the evolution of a species as the particular hormone developed by use or retrogressed by disuse, etc.

This theory seems to me to have some strong support in the specific reactions to definite chemical irritants so often witnessed in plant life and even in the animal kingdom. For instance, nearly every species of gall-producing parasite gives rise, as the result of a chemical stimulus, to specific varieties of galls, some of them of large size and most characteristic appearance. Again, in the animal kingdom, the action, presumably chemical in the end, of certain microbes produces characteristic reactions in the cells of the host, as for instance in leprosy, ringworm and tuberculosis. If then such gross chemical irritants as these produce characteristic changes in their hosts, may not the more subtle hormones exert a still more powerful effect, fashioning in fact step by step the complete individual from the fertilized ovum?

These analogies make the suggestion of the possible role of hormones in the evolution of the individual from the egg and of the transmission gradually of acquired characteristics to ultimate descendants at any rate more feasible than at first sight would perhaps appear.

Reverting once more to the question of ordinary somatic cells becoming under certain conditions germ cells, it has for long seemed to me highly probable that every cell still capable of multiplying was in fact a potential germ cell and that given the required conditions it would manifest such traits. Basing my views primarily on the work of Farmer, Moore and Walker, as submitted to the Royal Society, who have found close resemblances between many of the dividing cells of cancer and those of reproductive tissues, I believe that in cancerous conditions we have such a manifestation of germ-cell characters by originally ordinary somatic cells, and that this is primarily brought about by such cells having been subjected to an abnormal number of cell-divisions while being exposed to subtle poisonous influences such as those of tobacco smoke or nicotine, coal-tar products, paraffin, x-rays, certain rays of the sun, etc. I believe in fact

that cancerous conditions are merely an effort on the part of the cells of some particular area to prevent their destruction when subjected to prolonged adverse conditions by attempting to compass the rejuvenating effect of a sexual union. The cells really form actual though not potential gametes, but could these unite we would get a fertilized ovum which if it could get nourishment would form a new individual! Cancer is less to be looked on as a disease than as the natural consequence of the senescence of a group of cells.



BIOLOGICAL NOTES

on

ACACIA CELASTRIFOLIA.

By OSWALD H. SARGENT.

(Read before the Society, 26th November, 1907).

Acacia celastrifolia is classed by Bentham in "Flora Australiensis" as a variety of *A. myrtifolia*. I have only seen this one "variety" of the species, so I am unable to judge of its systematic value. I have called it by its varietal name for the sake of brevity coupled with exactness. Even this variety I have seen in but one place, a range of ironstone hills in the vicinity of "Cut Hill," where it is very plentiful. The soil of these hills is of loose spongy texture, being rich in brown humus. I have found a few specimens of this *Acacia* growing in firmer soil at the base of the hills, and one is at present doing well in stiff loam in our garden.

Its native hills are sparsely wooded with "White Gums" of several species, and a few "Red Gums" (*E. calophylla*) here and there. In between these Eucalypts there is a fairly dense undergrowth, which consists chiefly of Proteaceae, Myrtaceae, and Leguminosae.

Acacia celastrifolia is especially conspicuous. In many places it forms small thickets, and solitary individuals are numerous all over the range.

It is a handsome shrub of roundish outline, attaining a height of eight feet or more. I have not seen it in bloom smaller than about three feet, and the majority of flowering shrubs are about five feet in height.

It usually branches at the surface of the ground, but there is occasionally a short trunk. This (when present) and the branches are circular in section and clothed with a smooth grey bark. Slight longitudinal fissures are present in the oldest portions near the base of the shrub, but for several years the bark remains quite entire. The young branches are triquetrous. In the course of a year they become almost terete, and within

two years are completely so. The angles are traceable on the stems for many years as dark lines. These angles follow the orthostiches. They are specially prominent at their apices, where they form brackets on which the phyllodes are articulated. They gradually become less prominent as they descend the stem, till they completely vanish just before reaching the phyllode next below.

The phyllodes are arranged in 2-5 order. They are accompanied in early youth by small herbaceous linear stipules. These doubtless protect the young phyllodes: they fall off long before the phyllodes mature.

In shape the phyllodes vary from elliptical-lanceolate to broadly obovate. They are rather thick, leathery, dull green, slightly shiny, triveined—a vein almost as thick as the mid-rib running along each margin. The apex ends in a short acute upturned mucro; the base is swollen, somewhat fleshy, circular in section, petiole-like; and on the upper margin of the phyllode near the base is an oval, slightly concave, gland.

According to Bentham, the variation in breadth of the phyllode is the chief distinction between the several varieties of the species *Acacia myrtifolia*. The variation which I have observed in the variety under discussion is, I believe, largely due to nutrition, as the shape varies somewhat on the same shrub from year to year. At the same time "innate variability" may be partly responsible.

The inflorescence first appears about January as a conical bud in the axil of the phyllode. It is at this stage clothed with small, dark brown, rounded-triangular, imbricate bracts. These soon fall off as the inflorescence rapidly elongates. By the end of the month it is a naked fleshy rod bearing a number of tiny knobs (the young flower-buds) in pairs.

The flowers usually open in August. This year ('07) and last, however, I found the shrubs in full bloom before the end of July. At this time it presents a grand sight to the lover of Nature. In itself the plant is very beautiful—each bush aflame with a myriad rodlets of fluffy golden balls—but as I have seen it its surroundings intensify the beauty and lend enchantment to the scene.

From the brilliant mass of gold in the foreground the eye wanders to the sombre green tree-tops in the valley below, onward to the purple hills in the distance, and upwards to the bright blue sky. The weather is perfect, the atmosphere being pleasantly warm; and the ground under foot being still moist from winter rains is pleasant to walk upon. The leaves of the Eucalypts overhead wave lazily in the gentle breeze, various

birds chirp joyfully on bush and tree, busy bees make pleasant music on every side, and, last but by no means least, the air is laden with the delightful perfume which the Acacia blossoms exhale. This scent, I am told upon excellent authority, is "just like English 'May,' only rather stronger."

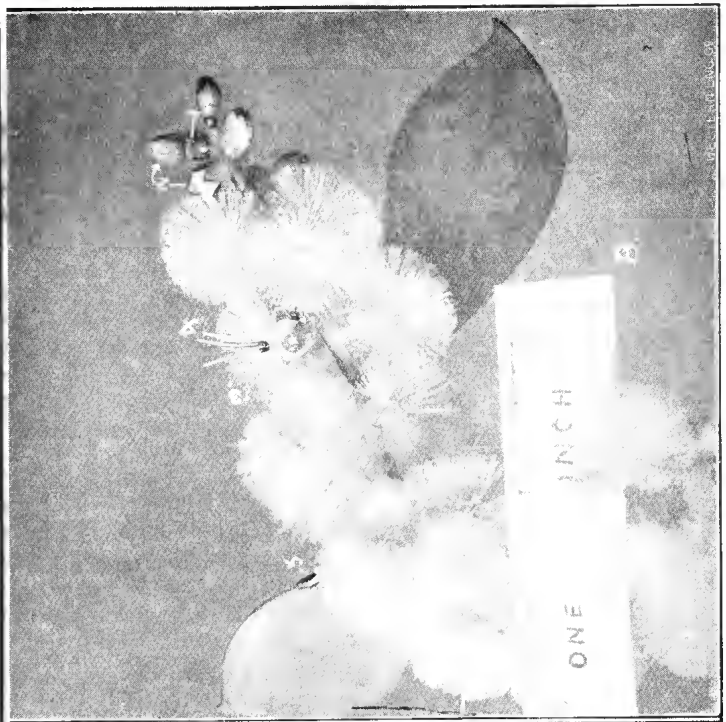
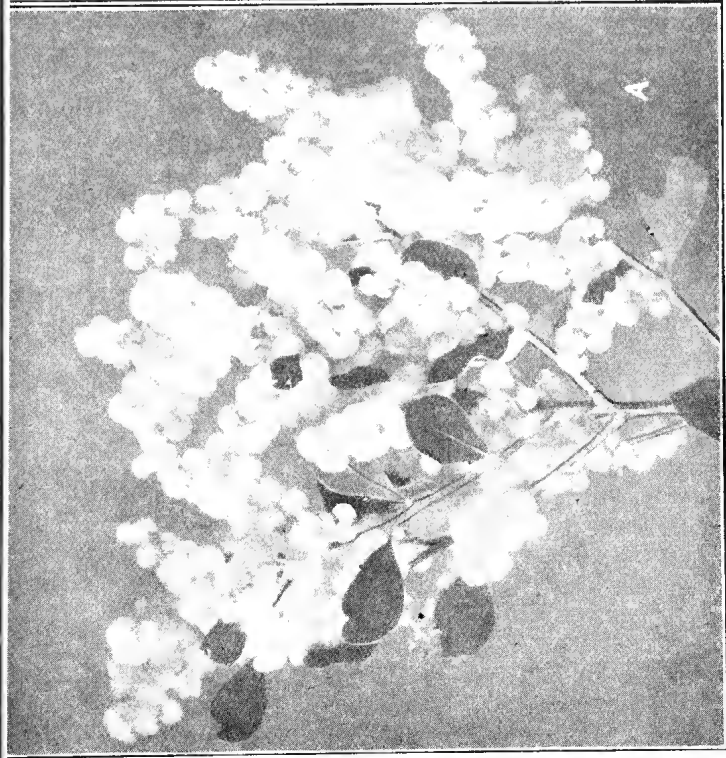
The flowers are borne in sessile pairs on short thick peduncles, rather distant on a thick rachis about as long as the phyllode. They are of two shades of colour—bright golden and pale sulphur yellow. Shrubs bearing pale flowers occur close beside golden-flowering shrubs, and there is nothing to suggest that soil or situation has any influence on colour.

The calyx is a fleshy ring with four prominences. The four petals are scarcely more than oblong scales: their only use seems to be protection of the essential organs in the bud. The two flowers of a pair open almost simultaneously and combine to form one fluffy ball. The stamens are very numerous, and are the most conspicuous part of the flower; indeed, the only visible part when the blossom is open. The filaments are slender and delicate, looking like threads of yellow silk. They are pointed at their apices. To these points the anthers are attached by the centres of their backs. They thus are able to swing freely in all directions. They are very small, almost cubical, with longitudinal dehiscence. The pollen-grains are rather few, combined in flat oval packets of eight. No visible change takes place when these packets are immersed in water. They germinate freely in 5 per cent. sucrose solution thickened with $1\frac{1}{2}$ per cent. gelatine. The tubes emerge at the junctions of the grains on the broad surface of the packet.

The gynaecium usually consists of four separate carpels. Each ovary is small, linear, and rather abruptly tapers into a filamentous style, stigmatic at its apex. The ovary contains eight ovules, which frequently all develop into seeds.

The fact that the number of pollen-grains in a packet corresponds with the number of ovules in each ovary seems significant, especially as the stigma is so small—a mere point at the tip of a slender thread. If a stigma receives pollen at all it *must* receive eight grains, and there is *at least a chance* of each one germinating and fertilising an ovule. The grains being all in one plane would almost surely all come in contact with the stigma.

The flower contains no nectar; but when the first flower on a raceme opens the gland on the phyllode at its base secretes a glistening globule of sweetish "dew." This secretion continues all through the time of flowering. As flowering proceeds the glands on phyllodes lower down the stem, though they have no flowers in their axils, also pour forth watery nectar. This



Acacia Celastrifolia.

- A. Flow-ring Branch, giving a good idea of the whole shrub, B. Raceme (enlarged). One flower with part of its stamens removed to show Ovaries. 1. Calyx. 2. Corolla. 3. Stamen 4. Pistils. 5. Phyllode Gland.

attracts multitudes of hive bees, but I have not seen the phyllodes visited by native insects of any kind. The bees are unsatisfactory as pollination agents, as they seldom get their backs dusted with pollen. The spike of bloom is not directly over the phyllode, but leaves the stem at a different angle. It diverges more and more from the upper edge of the phyllode as its apex is approached; but even the lowest blossom is rarely directly over the phyllode's edge. On this account a bee can readily sip nectar without coming in contact with the pollen-laden anthers, and it almost always does so.

For several years I was at a loss to understand matters, because pods developed freely especially towards the apices of the racemes, where nectar-sipping bees would certainly never rub their backs.

The stigmas appear to ripen simultaneously with the anthers; but fruit does not set quite freely enough to suggest autogamy. Indeed, the weight of positive evidence is against self-fertilisation. Never does every flower on a raceme set fruit and often whole shrubs are quite barren.

The bees sometimes collect pollen and in so doing doubtless often leave foreign pollen on the stigmas of flowers: pollen can be blown from the anthers, so the wind *may* just *occasionally* cause pollination; but, if pollen-collectors or wind were the chosen agents, why the copious stream of nectar from the phyllode-glands?

In August, '06, the agents of pollination literally *called* my attention to themselves. I was watching the bees at work on the phyllodes, when I was attracted by the twittering of birds on the Acacias behind me. I turned cautiously and beheld a number of "Silver-eyes" (*Zosterops Gouldi*) and other honey-eaters busily engaged sipping nectar from the phyllode glands. The mystery was solved. Since then I have repeatedly seen these birds on the shrubs.

Careful examination of a flowering branch shows it to be well adapted for bird-pollination. No hindrance is offered to the bird, as the saucer of nectar stands open beside the inflorescence; yet in sipping the sweet fluid the bird is sure to brush against the fluffy blossoms and have its feathers dusted with pollen. The next flower brushed against will receive some of this pollen on its stigmas. The birds hop rapidly from twig to twig, and frequently fly to other shrubs of the same species, so cross-pollination is sure to be freely effected.

Now it is evident that if only the phyllode immediately subtending the inflorescence secreted nectar, only one side of the spike would be touched by the birds; hence the value of the

lower phyllodes' store of nectar. It is scarcely possible for a bird to find nectar from any gland without coming in contact with some blossom.

Notwithstanding these adaptations, the method must upon the whole be considered crude. It is wasteful: not more than half the flowers ever produce seed, indeed, I very much doubt if more than one-fourth do. Undoubtedly, an abundant supply of seed is produced, but the point is, *it might be produced with much less expenditure of energy.*

Usually only one carpel of a flower develops into a fruit; moderately often two, and just occasionally three do so.

Both sutures of the fruit are thick, and at first quite straight but before it matures they become sinuous, the upper and lower sutures commencing to curve in opposite directions. This sinuosity seems not due to tension as the ribs do not make any effort to straighten when cut off. The mature pod is linear, about three inches long, curved, with a somewhat acute apex. It is woody in texture. When ripe it dehisces elastically with a sharp report. This occurs in December. The seeds are, of course, hurled to a distance from the parent shrub when the pod explodes. I have not succeeded in ascertaining how far they are thrown, as the pods refuse to burst when taken indoors. The sinuosity of the ribs causes the valves of the pod to gape more widely alternately above or below each seed. A perfectly clear path is thus secured for the seed's egress. The valves and the rachides to which they are attached ultimately fall off, and form a tangled mass beneath the parent shrub, where they very slowly decay.

The seeds are bacilliform, about $\frac{1}{4}$ -inch long, dark coloured, with smooth, hard, shining testae. Each is borne on a once folded filiform funicle, whose upper end is thickened into a small white aril. I have at various times tried many ways of inducing these seeds to germinate: I have sown them without previous treatment, I have soaked them in cold and in hot water, I have scorched them before sowing and after sowing, but all in vain—they have refused to grow. This year I have tried a new plan. I placed seeds between damp sheets of blotting paper and kept the paper damp. Several germinated in a few days, the rest rotted. This was a poor lot of seed collected at the close of last season. The temperature in the germinating box was never above 60°F.

I have not seen a sufficient number of very young seedlings to enable me to describe the first stages of growth. On young plants the stipules persist for some time, long after the leaves are mature. The early petioles are linear, but the broad phyllode

shape is soon attained, sometimes abruptly. The petiole bears at its apex two pinnae, each bearing from three to five pairs of oblong pinnules.

The phyllode gland now calls for some attention. Transverse and longitudinal sections show it to consist of a dense mass of parenchyma resting in a bed of lignified tissue. This tissue is pierced in several places by branches from the marginal vein of the phyllode. Immediately over this glandular tissue (*i.e.*, on the floor of the gland viewed from without) the cuticle is comparatively thin; over the rest of the phyllode it is very thick. Now these glands only secrete during the time of flowering. When active they continue to secrete for two days on phyllodes separated from the stems and placed with their bases in water. From these facts I conclude that the action of the gland is somewhat as follows:—A substance, perhaps an enzyme, is developed in the open flower. It travels to the gland via the vein. In the gland it causes the setting up of a strong osmotic current. This creates great tension in the gland cells, which being unable to expand on account of their unyielding surroundings, wood beneath and cuticle above, get rid of their surplus sap through the cuticle, which offers least resistance to the process.

The above sketch of the life history of *Acacia celastrifolia* is chiefly founded on field observations, and leaves much to be desired. Especially is the action of the gland deserving of careful attention. I am hoping to inquire fully into this and other interesting points when the shrub in my garden comes into bloom.

Addendum.—August, '08. Since reading the above further observations and experiments have convinced me that the action of the gland may be explained on general physiological principles.

The delicate floral structures must exhale a considerable quantity of moisture during the day. This necessitates a strong transpiration current. At night transpiration reaches a minimum long before root pressure does so, and consequently a superfluity of water accumulates in the tissues of the shrub. This condition is favourable to the action of the gland. Such is my idea in outline.

Experiments are still proceeding, and on some future occasion I hope to deal with the matter in detail.

A SCIENTIFIC TRIP

TO THE

NORTH COAST OF WESTERN AUSTRALIA.

By J. BURTON CLELAND, M.D.

AND

H. M. GILES, F.E.S.

(Read before the Natural History Society, on 22nd September, 1908.)

PART I.—GENERAL.

As members are doubtless aware, at the end of July, 1907, Mr. Giles and myself were instructed to proceed to Port Hedland to investigate the question of trypanosome infection in some of the 500 camels recently landed there from India and then in quarantine. The object of this paper is not to discuss the question of these parasites or our experiments therewith, but to give an account of other matters of interest to naturalists which came under our notice and to exhibit some of the specimens we were able to collect in our spare time—it is, in fact, what manufacturers would call the “bye-products” of the expedition which we present to you to-night. Just as, in certain trades, the bye-products sometimes assume the utmost importance and are often of great economic value, so do we think that, whenever Government officials in the course of their public duties have opportunities of making natural history collections and compiling important notes, they should be encouraged in every way to do so, as these bye-products, intelligently used, may be the starting point of great industries or assist materially in settlement on the land, quite apart from the scientific value of their labors and the additions to our museum collection. We therefore felt that, in employing our leisure time—and we may add that the hours we worked a day were considerably over the official hours recognized—we were doing also a service to the State in enlarging the knowledge of its fauna and flora.

On the voyage up nothing of moment occurred, beyond seeing flying fish and numerous whales, and once, in the distance, a thresher lashing a whale. Our first long run ashore was at Port Sampson, a few miles from Cossack, where we had to remain thirty-six hours. There are no houses here and merely a jetty for landing stock. The place is an island, being separated by mangrove swamps and creeks from the mainland, which are fordable at low water. The type of vegetation is Central Australian, *i.e.*, hairy and woolly plants or those in which the leaves are reduced to needles and spines, together with prickly spinifex-like grasses. The Papilionaceae were well represented, especially noteworthy being the "bird-flower," *Crotalaria Cunninghami* (like a Mandarin duck in shape and green in color), and Sturt's pea, *Clanthus Dampieri*.

On this North-West coast of Australia the rise and fall of the tides is very remarkable—in places up to thirty-eight or forty feet. At one moment, at ports where ships can make fast to a jetty, the latter towers above the former; a few hours later it is as far below. Dampier in his "Account of New Holland" noted this and thought that hereabouts might lie the supposed passage or strait leading eastward to the great south sea.

Port Hedland itself is of little interest, being merely a sandy island almost without vegetation, cut off from the mainland by mangrove creeks. However, on a flat limestone ridge bordering one of these creeks and quite close to the town are a number of rough native carvings chipped with much labor on the horizontal surfaces. Unfortunately, from constant traffic, many of these are nearly worn away and very indistinct, while the new proposed railway to Marble Bar has doomed what remain. Many of the carvings are complicated and symbolic, others represent emu-tracks and spears, still others fish (probably sharks) and turtles (Fig. 1 represents perhaps a shark; Fig. 2 is symbolic).

The country between Port Hedland and the Camel Camp, on the Strelley River, sixty miles inland, is of one general type—miles and miles of flat spinifex country almost without a tree and often not a shrub, broken by occasional high hills rising from the plain, often with flat tops and of extraordinary shape (ironstone) or of rounded boulders (granite and quartz), and traversed at intervals of miles by creeks, along whose banks are eucalypts of several kinds, melaleucas, wattles and numerous plants. These creeks are dry, save for occasional water-holes, often of fair extent, and, being very shallow, sometimes half a mile across with several channels. In times of flood, either from local rain or from the hills in the south, they must be magnificent torrents, to judge from the debris left behind, but the running of a "banker" seems to be an event that occurs about once in a lifetime.



Fig. 1. (Left half). Native rock-chipping on horizontal limestone at Port Hedland. Probably representing a shark.



Fig. 1. (Right half.)



Fig. 2. Another rock-chipping from Port Hedland. Probably emblematical.



Fig. 3. Termite's nest, Port Hedland.

Of animal life in these parts there is an abundance, but these are chiefly lizards, flies and hymenoptera, though kangaroos are also numerous. The abundance of flies form food for the countless lizards, mostly of small size, and these again attract many hawks, which seem to live almost entirely on lizards. The flies, *musca domestica* and *corvina*, are very numerous and persistent and worry one not only during the day but even at dusk also, and it is said on moonlight nights till 2 or 3 in the morning. They are very voracious and we found that if, after taking a blood slide from a camel and letting it dry we left it with its face exposed a fly, lighting on it and running over it with its proboscis rapidly removed the whole. Dampier in his voyage, when he touched on the N.W. coast of Australia, remarked on the hordes of flies and speaks of the aboriginals as always keeping their eyes half-closed in consequence. He says (1688), "Their eyelids are always half-closed, to keep the flies out of their eyes, they being so troublesome here that no fanning will keep them from coming to one's face; and without the assistance of both hands to keep them off, they will creep into one's nostrils, and mouth too, if the lips are not shut very close. So that, from their infancy, being thus annoyed by these insects, they do never open their eyes as other people, and therefore they cannot see far, unless they hold up their heads, as if they were looking at somewhat over them." Pelsart, also, when off this coast in 1629, speaks of their being "plagued with flies, and these in such multitudes that they were scarce able to defend themselves."

Several kinds of Termites were seen, of which two large mound-builders were conspicuous. Both of these formed large chambers, which were stored with *spinifex* leaves cut into lengths of about an inch. The one kind (Fig. 3) formed large dome-shaped nests, sometimes with a little rounded knob atop, up to 8ft. high and 13ft. in diameter. In the other, the mound was raised only a few inches above the ground to form hummocky masses perhaps a yard or so in extent. To these larger mounds Dampier evidently refers when he says in his "Account of New Holland," "There were several things like hay-cocks standing in the savannah, which at a distance we thought were houses, looking just like the Hottentots' houses at the Cape of Good Hope; but we found them to be so many rocks." And again, "There are a great many rocks in the large savannah we were in, which are five or six feet high, and round at top like a hay-cock very remarkable, some red and some white."

Of coccids, two interesting forms were seen. One formed large wrinkled woody apple-like galls on the Bloodwood (*Eucalyptus* sp.). The natives eat the large parasite inside, which hangs down like a large pupa suspended to the aperture in the summit. The other coccid occurred in the *spinifex* and was

attended by a species of ant which built over it a covering of reddish sand cemented with spinifex resin and of the same substances made covered ways on the ground from one tuft of spinifex to another.

One snake, a spinifex snake, was especially interesting. Its anterior two-thirds were yellowish with crossing lines, resembling the spinifex grass, while the last third was a rich reddish brown, the color of the surrounding sand, so that, as long as the fore part of the reptile was safely ensconced in the tuft of spinifex the tail could be exposed without attracting observation.

BOTANY.

The various species of spinifex (*Triodia*) are, of course, the most salient feature in the botany of these parts, covering as they do millions of acres of land. Stock can eat the softer kinds, but the harder only when young or with flower-stalks. The spinier kinds frequent the large intervals between creeks, while the softer occur on a narrow line near the dry water-courses. A different species of spinifex also seems to occur on the islands of small rocky stones cropping up in the midst of the sand of the spinifex plain, on which islands also a few gnarled prickly acacias and bloodwoods occur. These spinifexes exude an aromatic resinous substance from their leaves and stalks, which the natives use for fixing on their spear-heads with, and it is evidently this substance that makes the spinifex so inflammable and to burn with such an intense heat and dense smoke. Luckily, the spinifex tufts are usually some distance apart, so that a fire once started, though burning with intense fierceness while it lasts, can rarely extend far owing to these natural boundaries to its progress. Otherwise, woe betide the traveller in these parts surrounded and overcome by the fiercest of conflagrations! The flora springing up a year or so after such fires differs strikingly from the surrounding unburnt portions, for the growing spinifex is scattered, green and more succulent while various pea-plants (amongst them a species poisonous to stock) and herbs also appear. It seems possible that some use might be made of the resinous principle in spinifex and perhaps something might be extracted of great value in the arts. The inflammable nature of the plant induced a local inventor to attempt compressing it into "bricks" for combustion purposes, but the cost was far greater than the receipts. Mr. Nicholas has suggested the possible conversion of it into silo.

Five species of Eucalypt were seen in this part. The bloodwood formed a stunted and gnarled or more graceful small tree on the stony edges of the plain near the creeks. In flower and

bark and general appearance it suggested *E. calophylla*, the red gum of the south, and perhaps represents it here in the north. It exudes a reddish kino on injury and also harbors numbers of the large apple-shaped coccid already mentioned and frequently the nests of processionary caterpillars. *E. sp.* is a flooded gum, growing in the creek beds, sometimes attaining a good size. *E. microtheca* (F. v. M.) grows in a similar situation, has a white-washed-looking stem which yields a white bloom on touching, has a duller and narrower leaf and less erect stature. The fourth is a mallee growing in tufts on sand not far from creeks. The last grows sometimes into a stately tree, has broad somewhat rigid lightish green leaves and suggests an *Angophora*.

The Papilionaceae were numerous and often gorgeous in color or delicate in tint. The bird-flower and Sturt pea have already been noticed. A tall tree grew in the Shaw River which was covered with handsome white pea-flowers of delicate perfume each a couple of inches long and grouped in long pendulous masses.

J. BURTON CLELAND.

PART II.—ENTOMOLOGICAL.

It was at the end of July last year that we left Perth to get our first insight into the North-Western part of the State's Fauna and Flora. As you are aware, we were sent up in connection with the camel quarantine, but we also determined to occupy all our spare time in making what collections we could of the all-too-poorly-known natural history of this distant "way-back" region. Unfortunately, on reaching Port Hedland and seeing the frightfully dry and arid condition the country presented, our hopes were sadly damped of making any great collection unless rain came to assist us in our operations, as enquiries only confirmed the fact that these conditions had prevailed for some months before our arrival, needless to say, to the great detriment of the pastoral and mining industries, on which this part of the State depends.

We are quite certain that, with favorable weather conditions, our success would have been far greater. The immense quantities of insect remains lying about in every direction were alone sufficient evidence to us of that fact, had it not been amply confirmed by information from the few station-owners and others with whom we chanced to come in contact.

Although we could see amongst the insect remains many bodies and elytra that we feel sure are unknown to science, despite the most careful search we could not obtain those parts, such as head, antennæ, legs and feet, that one wants for classification, for this reason, that as soon as an insect dies it is at once devoured by birds, reptiles or small mammals, or else cut up and carried away by the innumerable hordes of ants, from whose vast brigades of searchers no place or thing is safe in these regions. And while we have a few of these relics, as evidence of locality, they are utterly useless as type specimens or for descriptive purposes, so that we can only long for a future acquaintance to benefit scientific knowledge.

My companion had to return to Perth after a two months' sojourn, but my stay was prolonged for some months, during which no rain came to our assistance, and so, as you will surmise, conditions became worse and worse for collecting. Still, as you will see from our exhibits to-night, we managed to obtain some interesting forms amongst the different orders, though, unfortunately, in many cases we only secured one or two specimens. In others, however, we obtained a good series, many of which will probably prove new to science.

In this brief paper our remarks are chiefly on the insect captures, as our avian specimens are not yet determined, and, if we have nothing new amongst them, you will see that we have come across various species that are only recorded from the Northern part of the State in the "Museum" list of Birds. We would draw your attention to one of our greatest prizes, as we do not think it has ever been exhibited before—that is the nest and eggs of *Emblema picta*, or the true painted finch.

Our reptiles are not over numerous perhaps as shown, but we may state that we have a fairly large number of snakes, lizards and geckos which are still in spirit, which will probably contain something of interest later on, as we hope will prove the ease with the botanical collection.

We will end these few preliminary remarks by giving a list of the number of captives of the orders and families of the Insect World which fell to our lot during this trip, with explanatory notes as we go.

As our greatest number of species was furnished by the order COLEOPTERA, we will commence with them.

Of the CICINDELIDÆ, or tiger beetles, only three species were taken, one of which may be new, as Sloane was doubtful at the time of writing as to its identity, while the other two are rare, although known, he says.

CARABIDÆ---this family would have been far better represented had more favorable weather conditions prevailed, as our number of species is only twenty-six, in fifteen genera.

Of the DYTISCIDÆ, or water-beetles, we did not expect to get many, so were not disappointed in only taking five species, in four genera, one of which, *Eretes australis*, is recorded from Tasmania, thus proving it to have a wide range, and establishing an addition to our fauna.

STAPHYLINIDÆ---this large Australian family was only represented by three species in two genera, all small.

SILPHIDÆ---only one species was met with, *Plomaphila lachrymosa*, which is widely distributed, and although so common, is one of the handsomest, as is evidenced by its being chosen to illustrate the family in the Cambridge Natural History series.

Of HISTERIDÆ, or mimic beetles, four species in two genera were taken.

TROGOSITIDÆ---two species in two genera, one of which, *Trogosita mauritanica*, is an introduction to our fauna we could have well done without, as it is a pest which is fast becoming cosmopolitan in its distribution.

COLYDIDÆ---three small species in two genera.

Of the universal DERMESTIDÆ we took three species of the typical genus, all introduced and pests of the first water, namely *D. cadaverinus*, *D. murinus* and *D. vulpinus*. We were astonished at the enormous numbers of these gentry to be met with everywhere we went. No matter how far out on the hottest and most barren sand plains, they or their larvæ simply teemed. They are one of Nature's greatest scavengers in the Nor'-West and perhaps, in one way, it is as well they are there, as they quickly get rid of the thousands of kangaroo carcasses which are shot by the kangaroo-ers simply for the pelts alone. In this labor they are aided by two other beetles which are just as numerous, *Necrobia ruficollis* and *violacea*, belonging to the CLERIDÆ family, and likewise introduced, and also by the myriads of flies. If these pests would only content themselves with their outside avocations they would be a blessing, but, unfortunately, they do not, but are a curse to all who have to live in those parts. As soon as evening comes on they come flying into houses, tents or whatnot, and swarm into everything in the way of food, completing the little it so often takes up there to banish appetite.

Our stock of SCARABÆIDÆ is only represented by twenty-seven species, comprising ten genera out of five sub-families. Nine species were of the *Trox* genus, another group of scavengers.

Only one CETONIDÆ was met with, *Eupacila inscripta*, generally known as the W beetle. One of the most lovely gems in the living state, dried specimens convey but a poor idea of its splendour.

The BUPRESTIDÆ, or jewel beetles, are a family richly represented in the Australian region, and were one in which we had hoped to gather a fair harvest, but you will see how disappointed we were doomed to be, as our total is only six species in four genera. The large purely Australian genus *Stigmodera* is represented by one species alone, out of its nearly four hundred, viz., *S. tricolorata*. Two specimens of this fine large species are all we can show.

ELATRIDÆ—of this well represented family seventeen species were taken in seven genera, of which *Agrypnus mastersi* was our largest species. But our best capture was the fine series of doubtless a new species of *Macromalocera*, only two species of which are at present catalogued, and Carter, to whom I sent it, says "it is unknown to me, and is not in the Macleay Museum, at Sydney." So as the types of the two named species are in the Oxford University Museum, we are sending it there for identification. Probably several of the smaller species will prove new, but this family is a difficult one to deal with, and we are unable to get specimens identified in Australia, as there is no specialist working at them.

The CLERIDÆ only yielded ten species in five genera. Two species are introduced and are referred to as working in co-operation with the DERMESTIDÆ. Four of the others are unknown to us.

In the BOSTRYCHIDÆ we met with that thorough Australian pest, *Bostrychus jesuita*, in great numbers and destroying every bit of scrub and timber used in the green state for fencing, bush houses or whatnot, with the exception of a species of *Melaleuca*. This is the pest that did so much damage to the telegraph poles in the early days, until they were replaced by iron ones. These creatures would attack the part above ground, and the *Termites* (white ants) that below, so it was one incessant toil of renewing them.

The large family of *Tenebrionida* only yielded us twelve species in seven genera, although we expected to find many more, but we have given the reason for their scarcity. However, we have two species each of *Saragus* and *Chalcopteris*, which H. J. Carter, who is working at this family, informs me are new to him. We also found the widely distributed sand groper of the coast which has been known since 1842 as *Sobas australis* common there as it is down here. This name will have to give

way to *Cardiomorpha heteromerus*, King, as Lea found that the type of 1913, Masters Catalogue, *Pedilophorus heteromerus* was the same.

The CURCULIONIDÆ only yielded us nineteen species in twelve genera, which is an excessively small number when we recollect that there are over twelve hundred in Master's Catalogue, and Lea has added probably several hundred since that was published in 1886. None of them are of special interest, in fact, two species were as common there as down here. We sent a few on to Sydney for naming, amongst which were the sexes of one of our large species belonging to the sub-family AMYCTERIDES; *Cubicorrhynchus bohemani*, Bohem. The male was made a separate species by Macleay under the name of *C. angularis*, but as the female was named first, the usual order of things is reversed, that is the male will now have to be known under the female's name of *C. bohemani*, at least so we are informed by Fergusson, who has undertaken the revision of this very difficult and confused sub-family, a task in which we wish him every success.

Two species of the curious shaped BRFNTHIDÆ are shown.

LONGICORNIA yielded us sixteen species in the three sub-families. The first, PRIONIDES, gave us a large species of *Eurynassa*, name not yet determined. The more elegant sub-family CERAMBYCIDES, yielded only six species, two of which are unknown to us, and two, *Phoracantha fallax* and *recurva*, are perfect pests in the Nor'-West, as they seem even more numerous than down here. Both these species are very widely distributed, probably over the whole continent. Sub-family LAMIDES gave us the remaining nine species, three of which are unknown to us. Another has been recently described by Blackburn as *Hebecerus dispar*, specimens of which are exhibited. Perhaps it would be opportune to mention that this "generic name," which contains many species in Australia, will have to fall, as Gahan, who is monographing the family at the British Museum, finds that it is preoccupied. Henceforth it should be known as *Ancita*. This genus also yielded us another species which we think is new, but, unfortunately, we could only take two specimens, one of which is damaged.

The families CÆDEMERIDÆ, CISTELIDÆ, ANTHICIDÆ, BYRRHIDÆ, CANTHARIDÆ, and CHRYSOMELIDÆ all gave us a few, mostly very small species, which we have not yet worked out. The last was particularly poor in species, but it has to be borne in mind that they are essentially plant feeders, and we have little doubt that the number would be considerably augmented in more favorable seasons.

As evidencing what remains to be done amongst our Coleoptera, we might mention that some time back we sent away 170 species for identification, and have just received our lists back, in which seventy-two are marked as unknown, as not in the Macleay Museum, or as new species.

The order LEPIDOPTERA proved as poor as may be surmised on hearing the arid dryness of the country. We expected to add many butterflies to our list, but we are sorry to confess that we only have four which we had not previously met with—three blues or LYCÆNIDÆ, and a small member of the PIERIDÆ, in fact the smallest member of this family in Australia, and our specimens are much smaller and paler in color than the Victorian ones. This pretty little insect has not been taken or recorded for this State previously as far as our knowledge goes. It is common in New South Wales and Queensland and is known as *Terias smilax*. Anderson and Spry, in "Victorian Butterflies," record it as occurring "all over Australia with the exception of West Australia," so we are glad to show our small treasure this evening.

We saw no members of the NYMPHALINÆ or HESPERIDÆ during our sojourn there. DANAINÆ was represented by numbers of the common *Danaus petilia*, but in a too worn and shabby condition for keeping, so we left them in peace, and also with bitter regret three or four fine specimens of the scarce larger species *D. eribpus*, which proved too shy and wary for capture. Besides the small species mentioned, the PIERIDÆ were represented by *Belenois java*, a wide ranging species of "white," and presumably by *Terias hecabe*, another wandering species, but we are not quite sure of our identification.

Many fine specimens of our only "swallow tail," *Papilio stenelus*, were observed in their wild strong flight, but all captured were so damaged that they were allowed to go again. We have never seen so many in this State previously, or such sorry looking members, and much regret that we could not get even one or two good specimens, as we only have two or three taken down here in the southern part, although this fine insect is unrecorded for this State.

HETEROCERA, or moths, are better represented than the butterflies, although our remarks as to scarcity will apply equally well. The fine introduced Hawk moth, *Protoparce convolvuli*, was captured and was our only member of the family taken. The Hakea Prominent *Danima banksiæ* was taken at rest during day time on its food plant. We also captured a fine *Spilosoma*, which is new to us and probably also to science. If so, I am suggesting that it be named after our worthy President as a memento of his visit to this part, not that I think he will need a reminder of it.

A few specimens of fine NOCTUIDS were brought back, amongst them the handsome *Orthreis fullonica*. Three fine specimens were captured at Condon one night trying their utmost to get into an empty beer bottle, which resulted in their exhibit here to-night. I heard the signal from the camel camp telling me that there was a fine butterfly there, so I hurried up, with the above result. I give the hint in case any lepidopterist is in that part to enable him to take this fine insect, or rather try to, because I must confess that although I stayed round that bottle for over two hours afterwards with the net and obtained a few, I tried for several nights following and never saw or took another specimen.

Time will not allow us to further generalise on them, suffice it to say that we brought back nearly 100 species of many interesting forms, but which we do not exhibit to-night, as they are not yet set out.

The order HYMENOPTERA is of very great extent in Australia and, if its many interesting and varied forms are not known to all colonials under that name we think there are but few, especially in the country, who have not suffered from the attentions of one industrious tribe belonging to it, the "ants," whose numbers are legion, and from whom no place or thing is sacred. I can assure you we found them one of the worst annoyances in that part. All day long we had to wage incessant warfare with small black species of the DOLICHODERINÆ—disgusting evil-smelling little brutes that would even get into tins, in company with a tiny little yellow wretch. No matter what they contained in the way of food supplies they would explore them. They belong to the genus *Iridomyrmex*, which is numerous in species in this State. Then all night long thousands of the large sugar ants, *Campanotus nigriceps*, and others of the genus, took possession of our camp, roaming into and over everything. The only thing we found to be the slightest check upon them was Cooper's Sheep Dip in the powder state, and, in spite of the dangers to food, this had to be continually renewed. Some of you may be interested to hear that this great genus—*Campanotus*—is distributed over the whole world, with probably 400 described species already. When systematically worked out, it is quite probable that Australia will record close on a hundred species of them. They are rather fine-looking ants, and if molested will bite severely on a delicate skin, but you can bear in mind "that they do not possess the exquisitely keen business end, which is such a feature of the Bull-dogs and Jumpers," belonging to the sub-family PONERINÆ. In other words they have no sting.

This order also includes the Bees and Wasps. We secured 11 species of "Native" bees, consisting of some pretty forms

Our largest is the fine *Xylocopa* sp. and the smallest a tiny fellow belonging to the *EXONEURA* genus. Midway are the handsome blue-banded species of *Podalirius* and the white spotted and banded *Crocisa*. Australia is richly endowed with Wasps, and our State is no exception. Although we only have six species of "true wasps," we got many of the Fossorial section, and in several cases males with the practically unknown females. These latter, with all our southern collection, we are forwarding by request to the British Museum authorities, to be worked out and incorporated in the Monograph they are having prepared of the "Fossorial Wasps." So that later on we may doubtless be able to furnish some interesting particulars, as likewise we shall then have our "nomenclature" on a sound basis.

The vast army of DIPTERA, or Flies, in actual numbers vastly exceed the above order, which is not to be wondered at when one understands the marvellous rapidity with which their complex and interesting life histories are completed. We have about fifty species of this order in the various families. Only two *Tabanids* were taken, a fair series of one, a handsome insect with beautiful green suffused violet eyes, but a most persistent blood-sucker, as are all the tribe *TABANIDÆ*. But all of you may not be aware of the fact that, like the little animal which makes "divine music" at night—the Mosquito—it is the female which has chiefly developed this blood-sucking propensity.

The second *Tabanus*, is probably an undescribed species, as its nearest congenor is *T. edentulus*, but it seems to us to have good specific characters from that species. We would draw attention to the species of *Conops*, which mimic the small wasp shown beside it, not only in coloration, but habits of flying in company and visiting the same flowers in search of sweets, so that on the wing it is very difficult to discriminate between them. You will observe that this is a case of converging mimicry, as the fly is a parasite of the wasp. Then the fine species of *Winthemia*, which somewhat resembles a much enlarged house fly at sight, belongs to a family that needs protection, on account of its natural habits—that is, they are chiefly parasitic on the larvæ of different species of moths. I have bred several species of this genus, which is rather a large one, from various Hawk, Bombyce, Arctid and Saturnid moths. This fact may be interesting to many, although the lepidopterist, after securing rare caterpillars, then taking them home and rearing them through their changes, with (in many cases) great difficulties, does not look at it in that light, as on going one morning to his breeding cages in eager hopes of seeing a fine example of some scarce or rare moth he has been perhaps years trying to get, he is confronted with two or four to five of these insects trying their utmost to get out. But his response has generally been to give them a vicious squeeze.

But we are glad to say that that is getting a thing of the past, for during the last few years many lepidopterists have carefully captured these (to them) intruders and handed them over to a specialist, with the result that many have been described as new, which is only another confirmation of "out of evil comes good." We might also draw your notice to specimens of the *Forest* and *Bird-flies* as they are generally termed. These sprawling hairy-legged insects more resemble spiders than flies to most people, although the presence of six legs only and the wings entirely separate them from the latter. They are very interesting in their habits, as all of them are parasitic on various species of mammals and birds. Some retain the wings for life, other species, as the Deer-fly, bite them off as soon as they find a suitable host, the females much more so than the males, so that it is difficult to get winged specimens of that sex. Then there are other genera that are wingless throughout, as the sheep-tick as it is commonly known, *Braula*, which are small peculiar shaped little creatures parasitic on bees, and *Nycteriba*, which are all parasites of bats. These are all interesting again from the fact that the young are reproduced in quite a different way to the ordinary manner of fly production, that is the larvæ are nourished in the body of the parent fly until fully developed, when they are extruded and immediately assume the pupal stage, as many older authors say, although, as is now known, this is erroneous in the case of the sheep tick. We personally watched the process on two occasions with the "Camel-fly," *Hippobosca camelina*, and there also it is the puparium which is extruded. You can also see the curious-shaped camel bot-fly, *Cephalomyia maculata*. One is turned upside down so that its enormous head may be seen. This fly, like so many of the bot-flies, is out of proportion to its enormous larva, of which specimens are exhibited. These large grubs or larvæ live in the nasal cavities of the camel to the number of, in one case we counted, seventy-one in all stages of growth from newly hatched to full fed, in which stage they drop out and enter the ground to assume the pupal stage, which varies from ten to over twenty days, I found, by artificial means, when they are again ready to carry out the divine command, "be ye fruitful and multiply," and one can see that—like the general rule in insect life—this is done in no half-hearted way, greatly to the discomfort of the poor host one would imagine. But the Afghans, and in fact the white men who have to do with them, stoutly maintain that the camel is no use without them. The Afghan put it this way, "Camel no good, him sick and bad, no good work, if no have bots," but we could get no other reason, or, in fact, that reason explained.

Order HEMIPTERA—we did not find nearly so many representatives of this great order as was expected. Of course, we have outlined the reason previously. Our number of species

is only twenty-six amongst the various families, the greater number of which are plant-feeders. But time will not allow us to dwell on them, so we would just draw your attention to the large species of WATER-BUG at the bottom, which Dr. Sharp says, in the "Cambridge Natural History," "is found in the waters of the warm regions of both the Old and New Worlds, where they are common insects, but as yet they have not been found in Australia," so even here again we can claim an addition to knowledge. This fine insect has some rather peculiar characters which time will not allow us to go into now. The name of this species is *Belostoma indicum* and it belongs to the family BELOSTOMIDÆ, which contains about a dozen genera with upwards of fifty species. They are generally known as fish-killers and they certainly deserve the name, for they do a frightful amount of damage especially amongst the young fry. This bug could easily kill a fish three or four inches in length, as we had several opportunities of seeing. We have not heard of their occurrence in the south of this State as yet and it is to be hoped that they will not come. Still, we are afraid it will be a vain hope, as they are endowed with great powers of flight, and if they can reach the North-West we see little doubt but that they will further extend their range to prove a serious handicap to the efforts of the Acclimatisation Society in their laudable efforts to stock our lakes and rivers with fish.

Sub-order HOMOPTERA—our exhibit comprises a fine new series of *Cicada*, in fact, the life history is shown with the exception of the eggs. Mr. Froggatt, who was in this State a fortnight ago for two days, paid me a visit, and said directly he saw it, "Oh, that is a new one right enough," and as he and Dr. Goding have only recently monographed the Australian CICADIDÆ, we think his opinion worthy of respect. He also said that the parasitic wasp was a new species, he felt sure. The wasp is pinned with its victim (the cicada) to show the mode of carrying, but you will see that in drying the tarsi (feet) have straightened out, thus relaxing their grasp. Just underneath are four species of North-West FULGORIDÆ, but they show no advance in size to species obtainable round Perth. In fact, all our Australian species are very small in comparison to the Indian and South American representatives, one of the latter measuring over four inches in expanse of wing. All ours are of very sombre coloring in contrast to the splendid coloring of those from the above regions. Then there are four species of our CERCOPIDÆ, generally known as Froth and Frog-hoppers. Our remarks to the last mentioned apply equally here.

BLATTIDÆ, or cockroaches, were more numerous by a long way, and we had collected a fine series, but, unfortunately, in shifting camp they were sent on by camels, and although the

boxes were rolled up in rugs and should have travelled in safety anywhere, on reaching the camp four day later they were found pitched off on top of two or three species of ants' nests and left in the sun, though we knew that unless some unusual violence had happened these pests could not get in. But we were doomed to disappointment, for on getting them out as quickly as possible we found the box crushed in and thousands of ants going off as fast as they could all heavily laden and returning empty for more. In scores of cases nothing remained but the pins to tell their tale. What had not been broken at first had been utterly ruined by these industrious little animals. We did not regret this so much from the cockroach view, as that the box had a splendid collection of NEUROPTERA, which were never seen again. Still, losing the roaches was unfortunate enough. We will just allude to the species at the bottom which we think is undescribed at present. But we must say that, of all vile, evil-smelling insects—and heaven knows there are some bad ones—this species will, undoubtedly, be first. You can wash your fingers but still its indescribable odor remains for hours.

— The ORTHOPTERA are represented to-night by six species of Locusts, one grasshopper of peculiar shape, one unusual-shaped cricket, one specimen of the cricket locust, *Paragryllacris* sp., which is probably undescribed, and six species of MANTIDÆ. Our PHASMIDÆ are too ruined to either show or suffice for naming, although we had a few very quaint forms of these "animated sticks," as one might appropriately term them.

Our PEUROPTERA are represented by seven species of the MYRMELEONIDES, or ant-lions, as they are generally termed. Froggatt, who has specially studied this group, said that the fine red-shaded species undoubtedly was new, and he had little doubt but that two others were also. However, he has offered to work out these and let us have the results later on, as well as to describe the new species in this order and in the HOMOPTERA. But we cannot but express our keen regret that this is the order in which we suffered our greatest and irreparable loss. Of one fine insect alone we had about a dozen perfect specimens on which we were priding ourselves, as it is only known by the type specimen taken some years ago in North Queensland. We had the sexes but, alas, we have not a single one now, and unless one goes there just at the right season specially to get it, it may never be seen again for years, particularly as it only flies for an hour or two just at midnight, we found. It was a lovely little gem, the two fore wings being like shining iridescent gauze, expanding about an inch, while the two posterior wings were drawn out into filament-like processes an inch and a quarter in length, making it one of the most ariel gems of the order

H. M. GILES.

SYSTEMATIC NOTES ON ORCHIDACEAE.

By OSWALD H. SARGENT.

Some time ago I came to the conclusion that it is practically impossible to identify some members of this order from the published descriptions. Accordingly, I sent specimens to Dr A. B. Rendle, of the British Natural History Museum for comparison with authentic types. The species so far dealt with are *Caladenia Patersoni*, *C. longicauda*, *C. dilatata*, *C. sacharata*, *Diuris setacea*, *D. carinata*, and *D. emarginata*. I offer hereunder a few descriptive notes of these, and a few other species.

Caladenia Patersoni (R. Br.). Sepals and petals *white* with long, *filamentous, tapering*, caudae (or "points"). Labellum white with pink fringe and calli. Calli somewhat *slender*, laterally *flattened, glabrous*. I have found this in sand, ironstone, and granite; in dry and in swampy places.

C. longicauda (Lindl.). Sepals and petals *yellow* with *thick, linear* caudae of about same length as lamina. The petals are sometimes without caudae. Basal portion of labellum yellow; apical portion deep crimson. Calli deep crimson, scarcely flattened, *thick, minutely hairy*. I have found this amongst granite and in sandy loam. Mrs. Stanway-Tapp kindly sent me several specimens collected in swampy ground at South Perth. These differ from mine in having purplish pink sepals and petals with rather slender caudae.

In this and the first-mentioned species the calli resemble the head of a golf stick in shape, and the rows (4 to 6) are rather widely spaced.

C. dilatata (R. Br.). Sepals and petals green, with purple stripe, edges much revolute, caudae slender clavate at apex. Lateral sepals strongly falcate, the apical portion being almost at a right angle with the basal. These sepals are bent at their point of insertion, making their laminae vertical, the inner surfaces facing outwards. On this account the caudae are erect. Lateral lobes of labellum very broad, pale green; middle lobe long and narrow, deep crimson towards the apex, which is much revolute. Calli long, slender, linear-clavate, deep crimson, in four rows closely set in the centre of the disk. The labellum is freely motile to and fro (rigid in *Patersoni* and *longicauda*). This species occurs on various soils, in damp and dry places. It grows freely on the top of Mt. Bakewell, from which locality all the flowers I have seen have the lateral lobes of their labella quite fringeless.

Early in October, '05, my brother brought me two specimens intermediate between *dilatata* and *Patersoni*. I feel satisfied that they were hybrids. The perigone more resembled *Patersoni*; but the lateral sepals were somewhat falcate. The labellum was intermediate between the supposed parents in shape, had a deep crimson apex, and was freely motile. The calli were like those of *dilatata*. The specimens were found in swampy ground amongst *Patersoni*. A few *dilatata* were in bloom not far off.

C. filamentosa (R. Br.) and **C. tentaculata** (*Tate* non Schlecht). These are closely allied, and it seems almost arbitrary to separate them; but as they can readily be distinguished I think it best to keep them apart. The parts of the perigone and labellum of the first-named are all deep crimson, and the veins of the labellum are inconspicuous.

The flower of *C. tentaculata* is larger than *filamentosa*'s, and the parts are relatively broader. Labellum white with crimson veins. Two varieties of this species occur here. One, which appears earlier than the other, has a *yellow* perigone with parts *horizontal*. The other's perigone varies from pale to deep *crimson* and the parts are *pendulous*. In both the dorsal sepal is erect. Both forms are common on various soils during August and September. *C. filamentosa* blooms about the same time, but is rather rare.

C. reticulata (Fitz.). This has not previously been reported from W.A. I found a few specimens on sandy loam near Gilgerring in September last. It resembles the yellow variety of *tentaculata*; but there are 4 or 6 rows of calli on the labellum instead of two. The labellum is yellow with deep crimson veins and apex.

C. saccharata (Reichb.). In Journal W.A.N.H.S., No. 3, I reported this as *C. carnea* var. *alba*. In almost every respect *saccharata* closely resembles *carnea*, of which I have two specimens from South Australia. The perigone of *saccharata* is dark grey outside, and glistening white within. The lateral lobes of the labellum are somewhat falcate, with acute apices. The middle lobe is linear-lanceolate, entire, much recurved, yellow. The calli are clavate, closely packed in two very regular rows, which extend almost to the apex of the middle lobe. In my specimens of *carnea* the lateral labellum lobes are rounded, the middle lobe is lance-ovate fringed with a few marginal calli, the disk calli are rather few, somewhat irregularly crowded at the base, and they do not extend beyond the base of the middle lobe.

I have found *C. saccharata* on ironstone near Cut Hill, near Qualin, and in the Talbot district. It usually occurs under *Oxylobium parviflorum* (Box Poison).

Diuris setacea (R. Br.). Leaves 8 to 10, linear, spirally twisted. Flowers sulphur yellow. Labellum with a single keel from base to apex, middle lobe somewhat spreading. Occurs on sand, and flowers in October and November.

D. carinata (Lindl.). Leaves 4 or 5, subulate. Scape about a foot high. Flowers about three-fourths of an inch wide and one inch long, yellow with a purple spot on base and apex of dorsal sepal and petals. Labellum, claw bicarinate, middle lobe rather closely reduplicate, *one-keeled*.

D. emarginata (R. Br.). Closely resembles the last-named, but taller, stouter, and larger flowered. Leaves semiterete. Petals without spots, often emarginate. Middle lobe of labellum somewhat spreading. Both this species and *carinata* inhabit swampy places and flower in October. They often occur together, when intermediate forms, which I think must be hybrids, are found amongst them.

Bentham's description of *D. setacea* seems most applicable to *D. carinata*, and the same is to some extent true of Brown's own description. I have on two different occasions sent specimens of both species to the British Museum, where they have been compared with authentic specimens, so there can be no doubt about the determination.

Pterostylis Sargenti (Andrews). I have found this fairly plentiful near Qualin and near Ronan's Well. Both places are about six miles from the site of the original discovery, the first south, the second west. This species varies very little, except in size of plant.

P. constricta (O.H.S.). In my original description of this I omitted to state that the rostellum (which may be described as a mucro, situate at the apex of the column) is deflexed and therefore horizontal. The anther is horizontal or slightly descending. I have examined specimens of the following allies of this species, viz.:—*Reflexa* (including one collected by R. Brown at Port Jackson in 1804), *reflexa* var. *intermedia* (Ewart), and *praecox*. In all these the sinus between the lobes of the lateral sepals is U-shaped (V-shaped in *constricta*), the rostellum is erect, anther ascending, and in none have I found any indication of a constriction near the apex of the labellum. This last, however, is sometimes *almost* absent from otherwise typical specimens of *constricta*. I am now inclined to admit into this species several forms which I formerly regarded as hybrids; but I still think that natural hybrids do occur. A few preliminary experiments tend to show that *constricta* and *reflexa* are *partial* y interfertile.

As my experience increases I become more and more convinced that hybridism plays a large part in the confusion of species amongst our Orchids. Years must needs elapse before hybridism can be *proved*. In the meantime it seems to me advisable to avoid uniting different forms under one specific name on the strength of intermediate forms merely.

